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New species and occurrences of *Bradleya* Benson, 1972, *Harleya* Jellinek & Swanson, 2003 and *Poseidonamicus* Benson, 1972 (Ostracoda: Cytheroidea) from the Atlantic Sector of the Southern Ocean

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ABSTRACT – The Southern Ocean shelf ostracod fauna is quite well known, while the bathyal and abyssal ones remain poorly understood. Herein, Recent Thaerocytheridae ostracods collected from deep regions in the Atlantic Sector of the Southern Ocean are described and figured. The discovery of *Bradleya mesembrina* Mazzini, 2005 extends its geographical and bathymetric distribution to the Antarctic zone of the Southern Ocean and to shallower (231 m) and to deeper regions (4420 m). *Harleya ansoni* (Whatley, Moguilevsky, Ramos & Coxill, 1998) is reported for the first time from the Weddell Sea. We also describe three new species: *Poseidonamicus hunti* Brandão & Päplow sp. nov., *Poseidonamicus tainae* Brandão sp. nov. and *Poseidonamicus yasuharai* Brandão & Päplow sp. nov. For the first time we provide SEM photos of the lectotype of *Poseidonamicus viminea* (Brady, 1880) *nomen dubium*. We observe that *P. yasuharai* displays features intermediate to *Harleya* and *Poseidonamicus*, indicating that these two genera may require new diagnoses. The bathymetric distribution of *Poseidonamicus* is extended to the abyssal zone and to shallower environments, and its geographical distribution is extended southwards. Finally, the inter-specific variability in the number and type of setae and claws found on several segments of *Poseidonamicus* limbs are intermediate between the highly variable Bairdioidea and the homogeneous Macrocyprididae. *J. Micropalaeontol.* **30**(2): 141–166, September 2011.

KEYWORDS: *Thaerocytheridae, new species, Southern Ocean, geographical distribution, bathymetric distribution*

INTRODUCTION

The Southern Ocean continental shelf fauna is quite well known compared to the bathyal and abyssal faunas (Clarke & Johnston, 2003). Distribution of many species was reported as eurybathyic (Brey *et al*., 1996) and circum-Antarctic (Clarke & Johnston, 2003). However, an increasing number of publications show that many, previously considered widely distributed, species are actually groups of distinct species, each one with restricted (not circum-Antarctic, nor eurybathic) distributions (e.g. Dahl, 1990; Brandão *et al*., 2010) and that – at least in the Weddell Sea – the bathyal fauna is significantly different from the shelf and abyssal faunas (Kaiser *et al*., 2011).

Where benthic Ostracoda from the Southern Ocean are concerned, there are over 100 papers published to date. Kornicker (1993), for the suborder Myodocopina, and Hartmann (1997), for the subclass Podocopa, summarized the taxonomic information on the Antarctic and Subantarctic species recorded up to those dates (i.e. approximately 50 papers). Both authors provided a list of references, identification keys and illustrations down to species level. More recently, all taxonomic and biogeographical information on benthic Southern Ocean Ostracoda (including also the 50 papers published after Kornicker (1993) and Hartmann (1997)) is in the process of being summarized by the senior author of the present paper and will be uploaded soon on the SCAR-MarBIN (Scientific Committee on Antarctic Research-Marine Biodiversity Information Network) website (www.scarmarbin.be), the OBIS (Ocean Biogeographic Information System) node for the Antarctic.

Additionally, Blachowiak-Samolyk & Angel (2008) revised, summarized and provided an identification atlas for the planktonic ostracods of the Southern Ocean, mostly for those belonging to the order Halocyprida, but also for a few species of the myodocopid subfamily Cypridininae.

Based on the 100 publications mentioned above, a total of 334 ostracod species were recorded from the Antarctic and Subantarctic zones of the Southern Ocean. Among these, 284 species are benthic, while 50 species are pelagic (http://www.scarmarbin.be). Approximately 90% of the benthic species were recorded from the continental shelf (S. N. Brandão, unpublished database), while a few studies involve deep samples (e.g. Ayress *et al*., 2004; Brandão, 2008a, b, 2010; Chavtur *et al*., 2010).

The present paper studies both live and subfossil benthic ostracods collected from the Atlantic Sector of the Southern Ocean and provides basic information on the species of the thaerocytherid genera *Bradleya* Benson, 1972, *Harleya* Jellinek & Swanson, 2003 and *Poseidonamicus* Benson, 1972, including the description of three new species. The specimens studied here were collected during four cruises of the German Research Vessel *Polarstern*. Three of these cruises were during the ANDEEP (ANtarctic benthic DEEP-sea biodiversity, colonization history and recent community patterns) project, which aimed to reverse the lack of knowledge on the deep Southern Ocean benthos by analysing bathyal and abyssal samples (see Brandt *et al*., 2007 for an overview of ANDEEP). The fourth cruise was part of the EASIZ (Ecology of the Antarctic Sea Ice Zone) project and samples were collected from the shelf and continental slope of the Scotia and Weddell seas (for an overview of the EASIZ project, see Clarke & Arntz, 2006).

Previous publications on ANDEEP and EASIZ ostracods are concerned with the macroecology and taxonomy of Macrocyprididae (Brandão, 2010), Bairdioidea (Brandão, 2008a), Platycopida (Brandão, 2008b) and Cypridinidae (Chavtur *et al*., 2010), and the genetics of Macrocyprididae (Brandão *et al*., 2010).

The first genus studied in the present paper is *Bradleya* Benson, 1972, which has a world-wide distribution, from the Paleocene to the Recent, and lives from 496 m to 4675 m depth. At least 166 species have been assigned to *Bradleya* so far. However, several species actually belong to other reticulated genera, such as *Agrenocythere* Benson, 1972, *Ambostracon* Hazel, 1962, *Hermanites* Puri, 1955, *Radimella* Pokorny, 1969 and *Thaerocythere* Hazel, 1967 (Benson, 1972) and the real number of described species is more likely to be around 40. The discovery of *Bradleya mesembrina* Mazzini, 2005 in our samples extends its geographical and bathymetric distribution to the Antarctic zone of the Southern Ocean and to shallower and to deeper regions.

The second genus studied here is *Harleya* Jellinek & Swanson, 2003, which has a distribution restricted to Recent sediments from mid-depths (990–2370 m) of the Antarctic zone of the Southern Ocean (Jellinek & Swanson, 2003). This genus includes only two named species. *Harleya ansoni* (Whatley, Moguilevsky, Ramos & Coxill, 1998) is reported here for the first time from the Weddell Sea.

The three new species described here belong to the genus *Poseidonamicus* Benson, 1972, a genus inhabiting the continental slopes and mid-oceanic ridges of the world's oceans. The oldest record of this genus is *Poseidonamicus major* Benson, 1972 from Oligocene deposits (approximately 33 Ma ago) in the northern Atlantic (Benson, 1972). Today, a total of 17 species of *Poseidonamicus* are known (Benson, 1972; Whatley *et al*., 1986; Hunt, 2007; Yasuhara *et al*., 2009), plus the three new species described here. The previously recorded bathymetric range of *Poseidonamicus* was from 1200 m (*Poseidonamicus pintoi* Benson, 1972) to 3140 m (*Poseidonamicus nudus* Benson, 1972). The following four species are known from the Subantarctic zone of the Southern Ocean: *P. hisayoae* Yasuraha, Cronin, Hunt & Hodell, 2009; *P. major*; *P. minor* Benson, 1972; and *P. ocularis* Whatley, Downing, Kesler & Harlow, 1986 (Benson, 1972, Jellinek & Swanson, 2003; Mazzini, 2005; Yasuhara *et al*., 2009). However, until now, not a single *Poseidonamicus* species was known from the Antarctic zone (see definition of Antarctic and Subantarctic zones in the section 'Material and methods'). As a result of the present study, the bathymetric distribution of *Poseidonamicus* is extended to the abyssal zone and to slightly shallower depths. Similarly, the geographical distribution of this last genus is extended southwards by 20° of latitude. Finally, we provide the first SEM photo of the lectotype of *Poseidonamicus viminea* (Brady, 1880) *nomen dubium*.

MATERIAL AND METHODS

The present study examined 165 live (= with soft parts) specimens and 339 subfossils (= empty valves) from 35 samples taken on board the RV *Polarstern* in the Atlantic Sector of the Southern Ocean, from 41°7.03′ S to 75°26.9′ S, from 9°54.88′ E to 64°39.45′ W and from 231 m to 5194 m depth (Table 1, Figs 1–3). These samples were collected during the three ANDEEP cruises (*Polarstern* cruises PS 61/ANT XIX/3, PS 61/ANT XIX/4, and PS 67/ANT XXII/3) (Brandt *et al*., 2007) and one EASIZ cruise (PS 48/ANT XV/3) (Arntz & Gutt, 1999). The gear used comprised the epibenthic sledge (EBS) (model described by Brenke, 2005), the boxcorer (GKG) and the Agassiz trawl (AGT). The EBS and AGT samples were fixed in pre-cooled (0°C) 96% ethanol and kept at 0°C for at least 48 h. The GKG samples were fixed in 4% formalin, and transferred to 96% ethanol after sorting.

The subfossil (= empty) valves were transferred to micropalaeontological slides and specimens containing limbs were kept in ethanol (either 70% or 96%). All specimens in the samples were picked. For study under the optical microscope, specimens were dissected in Hydromatrix permanent medium and their valves were transferred to micropalaeontological slides. Each dissected specimen, and a few subfossil specimens, was numbered with the prefix SNB for future study, ensuring the correct assignment of the soft parts (on glass slides) to their appropriate valves (on micropalaeontological slides) and to illustrations (Table 2).

The drawings were made with the aid of a camera lucida attached to a Zeiss microscope, and were digitally inked using the program Adobe Illustrator. Notice that while both SNB and OP are authors of *P. yasuharai* and *P hunti*, SNB alone is the author of *P. tainae*.

The valves selected for scanning electron microscopy were coated with carbon or gold in an evaporation unit PD170AZ from Leybold-Heraeus, and were observed in a LEO 1525 scanning electron microscope (Carl Zeiss SMT).

Identification of specimens was based on descriptions and illustrations of the genera *Bradleya*, *Poseidonamicus* and *Harleya* and their species as presented by Benson (1972), Whatley *et al*. (1986, 1998), Jellinek & Swanson (2003), Mazzini (2005) and Hunt (2007) and the descriptions of valves follow the nomenclature proposed by Benson (1972) (for the moral loop, anterior and posterior reticular fields) and Hunt (2007) (for the anterior and posterior cardinal angles, anterior and posterior marginal rims, dorsal and ventrolateral ridges). Measurements of the valve length do not include spines.

For the soft part anatomy, we use the terms suggested by Horne *et al*. (2002): (1) antennula, (2) antenna, (3) mandibula; (4) maxillula ; (5) fifth limb; (6) sixth limb; (7) seventh limb; (8) male copulatory limb; (9) furca.

The chaetotaxy formulae are based on Schornikov & Keyser (2004), with the following modification: 'd' denotes carrot-like seta (Pl. 9, fig. G); 'sfc' denotes structure supposedly formed by the fusion of a setae and a claw. As Schornikov & Keyser (2004) explained:

- figures (i.e. numerals and letters) without parentheses denote segments numbered from proximal to distal; '+' is used when two segments are fused;
- figures within parentheses denote the number of setae; the numerator is the setae on the dorsal margin, the denominator on the ventral margin; figures after the colon denote lateral, medial or apical armature elements, from dorsal to ventral;
- figures within parentheses without letters are normally developed setae; 'c' –claw-shaped seta or claws; 'l' – lateral seta, 'p' – plumose seta, 'r' – rudimentary seta, 's' – sensory seta, 't' – tooth-shaped seta;

Station	Deployment	Project	*Polarstern* cruise	Locality	Date	Latitude		Longitude		Depth (m)		Gear
						Begin	End	Begin	End	Begin	End	
16	7	ANDEEP III	PS 67/ANT XXII-3	Cape Basin	25/01/2005	41°7.75′ S	—	9°56.06′ E	—	4723	—	GKG
16	10	ANDEEP III	PS 67/ANT XXII-3	Cape Basin	26/01/2005	41°7.57′ S	41°7.03′ S	9°55.97′ E	9°54.88′ E	4721	4686	EBS
16	11	ANDEEP III	PS 67/ANT XXII-3	Cape Basin	26/01/2005	41°7.66′ S	41°7.42′ S	9°56.26′ E	9°54.92′ E	4727	4730	AGT
41	3	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	26–27/01/2002	59°21.97′ S	59°22.55′ S	60°4.27′ W	60°4.01′ W	2380	2359	EBS
42	2	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	27/01/2002	59°39.88′ S	59°40.32′ S	57°35.94′ W	57°35.64′ W	3681	3690	EBS
43	8	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	04/02/2002	60°26.48′ S	60°27.24′ S	56°4.00′ W	56°5.25′ W	3953	3962	EBS
46	7	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	30/01/2002	60°39.19′ S	60°38.06′ S	53°56.85′ W	53°57.51′ W	2889	2893	EBS
80	6	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	22/02/2005	70°39.37′ S	70°40.48′ S	14°43.51′ W	14°43.77′ W	3095	2970	AGT
80	9	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	23/02/2005	70°38.46′ S	70°39.19′ S	14°42.87′ W	14°43.44′ W	3136	3102	EBS
81	8	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	24/02/2005	70°31.08′ S	70°32.32′ S	14°34.83′ W	14°34.94′ W	4420	4384	EBS
89	—	EASIZ II	PS 48/ANT XV-3	Weddell Sea	04/02/1998	73°27.5′ S	73°27.3′ S	22°45.7′ W	22°45.6′ W	1639	1633	EBS
99	4	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	12/02/2002	61°7.44′ S	61°6.41′ S	59°15.40′ W	59°17.63′ W	5194	5182	EBS
102	13	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	06-07/03/2005	65°33.19′ S	65°34.31′ S	36°33.25′ W	36°31.04′ W	4818	4803	EBS
107	—	EASIZ II	PS 48/ANT XV-3	Weddell Sea	06/02/1998	73°34.77′ S	73°34.92′ S	22°38.29′ W	22°38.89′ W	938	924	EBS
110	8	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	10/03/2005	64°59.21′ S	65°0.91′ S	43°2.06′ W	43°2.10′ W	4696	4697	EBS
114	4	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	17–18/02/2002	61°43.59′ S	61°43.51′ S	60°42.52′ W	60°44.44′ W	2858	2921	EBS
129	2	ANDEEP I	PS 61/ANT XIX-3	Scotia Sea	23/02/2002	59°52.55′ S	59°52.20′ S	59°57.26′ W	59°58.63′ W	3631	3637	EBS
131	3	ANDEEP II	PS 61/ANT XIX-3	Weddell Sea	05/03/2002	65°19.19′ S	65°19.99′ S	51°32.54′ W	51°31.23′ W	3055	3050	EBS
132	2	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	06/03/2002	65°18.25′ S	65°17.62′ S	53°22.79′ W	53°22.86′ W	2082	2084	EBS
133	3	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	07/03/2002	65°20.40′ S	65°20.09′ S	54°14.11′ W	54°14.36′ W	1123	1123	EBS
133	2	ANDEEP III	PS 67/ANTXXII-3	Weddell Sea	16/03/2005	62°46.73′ S	62°46.34′ S	53°2.57′ W	53°4.14′ W	1582	1581	EBS
134	4	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	09/03/2002	65°19.71′ S	65°19.05′ S	48°6.27′ W	48°2.92′ W	4059	4069	EBS
134	5	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	09/03/2002	65°20.10′ S	—	48°5.33′ W	—	4062	—	GKG
136	4	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	12/03/2002	64°1.46′ S	64°1.51′ S	39°9.86′ W	39°6.88′ W	4782	4745	EBS
137	4	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	15/03/2002	63°46.33′ S	63°44.74′ S	33°47.16′ W	33°48.22′ W	4978	4975	EBS
138	6	ANDEEP II	PS 61/ANT XIX-4	Weddell Sea	17/03/2002	62°58.63′ S	62°57.99′ S	27°57.04′ W	27°54.28′ W	4556	4541	EBS
139	6	ANDEEP II	PS 61/ANT XIX-4	off South Sandwich Islands	20/03/2002	58°13.45′ S	58°14.15′ S	24°23.04′ W	24°21.21′ W	3991	3947	EBS
140	8	ANDEEP II	PS 61/ANT XIX-4	off South Sandwich Islands	22/03/2002	58°15.21′ S	58°16.29′ S	24°52.90′ W	24°54.10′ W	2965	2962	EBS
141	10	ANDEEP II	PS 61/ANT XIX-4	off South Sandwich Islands	23/03/2002	58°25.55′ S	58°24.63′ S	25°0.22′ W	25°0.74′ W	2369	2258	EBS
143	1	ANDEEP II	PS 61/ANT XIX-4	off South Sandwich Islands	25/03/2002	58°44.91′ S	58°44.45′ S	25°10.11′ W	25°10.66′ W	801	753	EBS
145	—	EASIZ II	PS 48/ANT XV-3	Weddell Sea	10/02/1998	74°38.0′ S	74°37.9′ S	27°11.0′ W	27°10.4′ W	1056	1061	EBS
154	9	ANDEEP III	PS 67/ANT XXII-3	Weddell Sea	30/03/2005	62°32.53′ S	62°31.32′ S	64°39.45′ W	64°38.67′ W	3782	3820	EBS
171	—	EASIZ II	PS 48/ANT XV-3	Weddell Sea	12/02/1998	75°26.7′ S	75°26.9′ S	26°39.9′ W	26°39.3′ W	231	231	EBS
272	—	EASIZ II	PS 48/ANT XV-3	Weddell Sea	26/02/1998	71°28.8′ S	71°29.0′ S	15°10.4′ W	15°10.3′ W	2076	2003	EBS
323	—	EASIZ II	PS 48/ANT XV-3	Scotia Sea	17/03/1998	62°25.3′ S	62°25.4′ S	58°42.2′ W	58°42.5′ W	1499	1490	EBS

AGT, Agassiz trawl; EBS, epibenthic sledge; GKG, boxcorer (in German *GroßKastenGreifer*); PS, RV *Polarstern*.

Table 1. Details of sampling localities of the specimens studied.

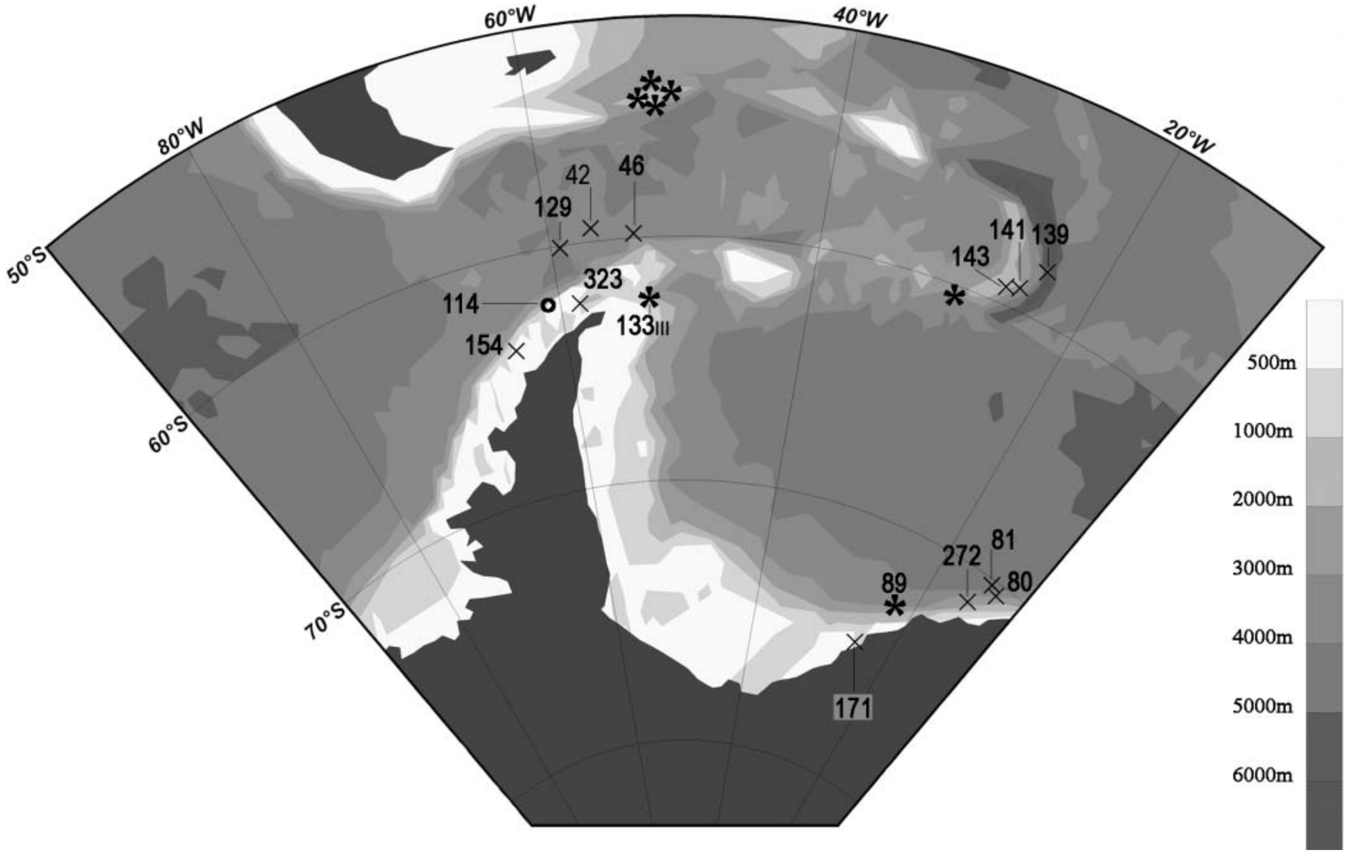


Fig. 1. Geographical distribution of *Bradleya mesembrina* Mazzini, 2005 (X), *Bradleya* sp. (open circle) and *Harleya ansoni* (Whatley *et al*., 1998) (asterisk). Arabic numerals are the station numbers as in the cruise reports (see Table 1 for details). Asterisks without numbers are stations studied by Whatley *et al*. (1998).

- a dot indicates the presence of an interval between setae or between segment ends; a colon indicates apical, lateral or medial setae; a hyphen indicates variable elements;
- commas are used for clarity, e.g. to separate symbols by unarmed segments or setae without indexes;
- for the nomenclature used for segments of different limbs see Plate 9.

In the sections entitled ‘Material’, the stations of the ANDEEP cruises are given as follows: station number according to cruise report, followed by a minus (‘–’) and the deployment number (e.g. “133-2” is the second deployment of station 133). In the case of samples collected with the epibenthic sledge (EBS), these two numbers are followed again by a minus (‘–’) and ‘E’ (for epinet) or ‘S’ for supranet or ‘E+S’ when specimens collected on both epinet and supranet were stored together in one glass or slide or ‘U’ when the animal was outside both nets (for example, on sediment above the metal box of the EBS). For example, ‘133-2-E+S’ means that the EBS was the second gear deployed at station 133 and that specimens collected on both epinet and supranet were placed in one glass or slide.

All specimens are deposited in the Crustacean collection of the ‘Zoologisches Museum Hamburg’, Universität Hamburg, under the abbreviation ZMH K-.

Here a ‘live’ specimen means that the specimen was collected with soft parts, in contrast to subfossils, which were specimens collected as empty valves or carapaces.

The maps were created with the program Ocean Data View (Schlitzer, 2007). We follow SCAR-MarBIN (www.scarmarbin.be) on the operational northern limits of the (1) Antarctic and (2) Subantarctic zones of the Southern Ocean.

1. Antarctic zone: (1.a) South Atlantic: (1.a.1) between 60°W and 50°W: 57°S; (1.a.2) between 50°W and 30°E: 50°S; (1.b) Indian Ocean: (1.b.1) between 30°E and 80°E: 50°S; (1.b.2) between 80°E and 150°E: 55°S; (1.c) South Pacific: between 150°E and 60°W: 60°S.
2. Subantarctic zone: (2.a) South Atlantic and Indian Ocean: between 65°W and 140°E: 43°S; (2.b) Pacific Ocean: (2.b.1) between 140°E and 176°W: 48°S; (2.b.2) between 176°W and 80°W: 45°S; (2.b.3) between 80°W and 72°W: 41°S.

Abbreviations

(A-1), last juvenile stage; AGT, Agassiz trawl; E (after a station number), epinet of EBS; EBS, epibenthic sledge; GKG, box-corer (German *GroßKastenGreifer*); H, height; L, length; m, metres; mm, millimetres; S (after a station number), supranet of EBS; SNB, specimen number as catalogued by the first author; U (after a station number), sediment outside both nets of EBS;

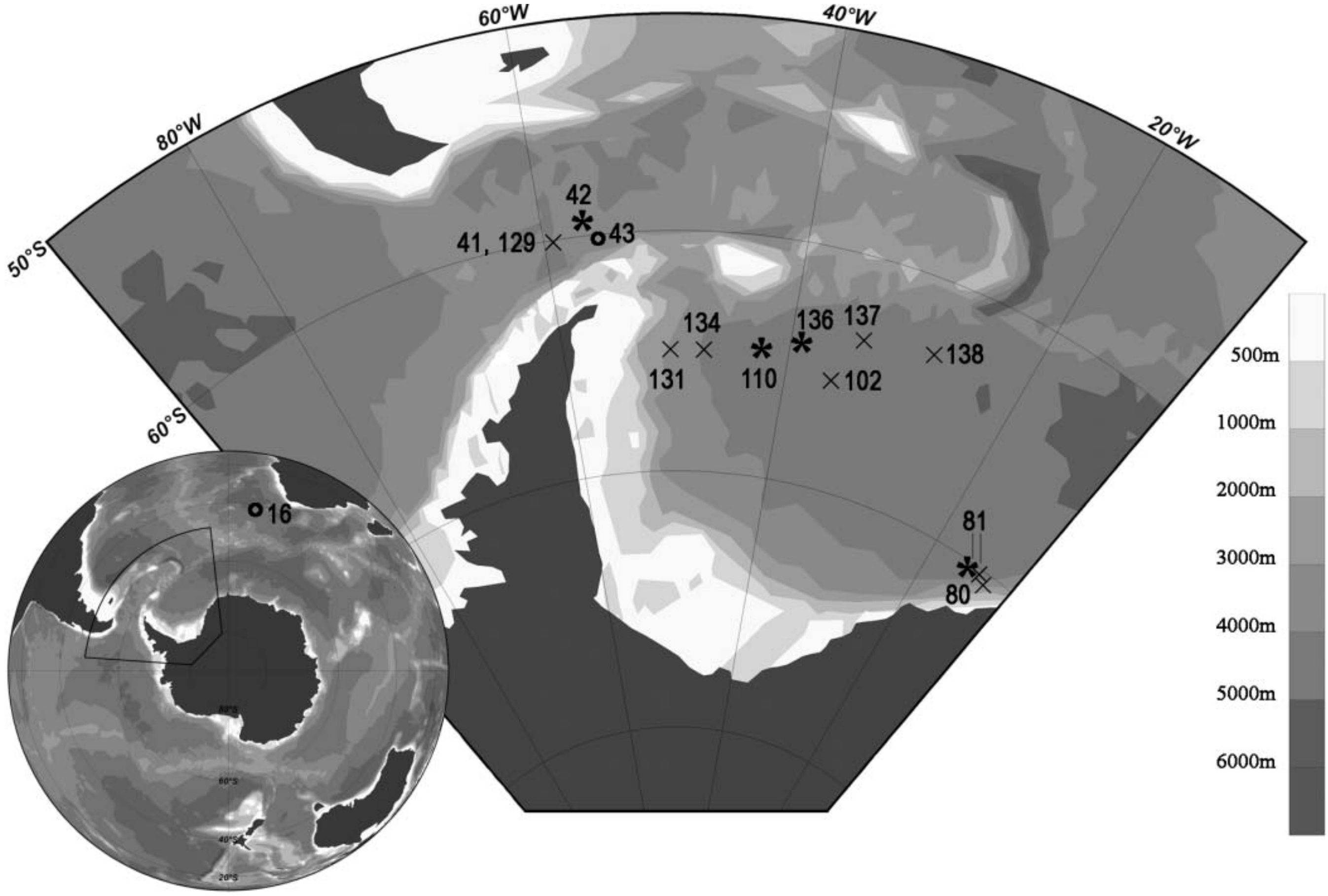


Fig. 2. Geographical distribution of *Poseidonamicus hunti* Brandão & Päplow sp. nov. (X), *Poseidonamicus tainae* Brandão sp. nov. (asterisk) and *Poseidonamicus* sp. cf. *P. tainae* Brandão sp. nov. (open circle). Arabic numerals are the station numbers as in the cruise reports (see Table 1 for details).

W, width; ZMH K-, Crustacea collection of the Zoologisches Museum, Universität Hamburg (Germany).

REMARKS ON THE SYSTEMATICS AND MORPHOLOGY OF *POSEIDONAMICUS* AND *HARLEYA*

Generic concept

Poseidonamicus yasuharai Brandão & Päplow sp. nov. displays features of *Harleya* and *Poseidonamicus,* which suggests that both genera may be synonyms: (1) sub-quadrate lateral outline typical for *Harleya* (*Poseidonamicus* shows more irregular shapes); (2) three (or four) frontal scars also typical for *Harleya* (instead of the two scars of *Poseidonamicus*); (3) vertically aligned fossae and muri of the posteromedian area of lateral valve surface, and vertically orientated central mural loop (typical of *Poseidonamicus*).

Chaetotaxic variability in the genus *Poseidonamicus* (Pls 5, 9)

The study of the limbs of the three new species described here shows a high inter-specific variability of the number and type of setae and claws on several limbs. The variability range of *Poseidonamicus* is intermediate to the highly variable Bairdioidea (Brandão, 2008a) and the highly homogeneous Macrocyprididae (Brandão, 2010). A number of differences were noted.

1. Antennula. The dorsal margin of segment IV of *P. hunti* sp. nov. displays a plumose seta, which is simple in *P. yasuharai* sp. nov. One of the four distal setae of segment V has a rounded tip in *P. yasuharai* but is reduced in *P. hunti* and *P. tainae*. Segment VII has two distal claws in *P. yasuharai*, but one distal claw and one (possibly sensory) seta in *P. hunti* and *P. tainae*.
2. Antenna. Ventrally, segment IV of *P. yasuharai* bears 1 seta, 1 plumose claw and 1 (possibly sensory) seta, while in *P. hunti* this segment has 3 distal setae and 1 reduced seta and, in *P. tainae*, the same segment has three ventral setae and 2 distal setae.
3. Mandibula. The exopodite differ in the number of setae: *P. yasuharai* has five dorsal setae, 1 of them plumose; while *P. hunti* has two distal setae and *P. tainae* has 3 or 4 setae plus one plumose seta. Segment III of *P. yasuharai* bears 5 distal setae, 1 dorsal seta and 4 lateral setae, of which 1 is plumose. Segment III of *P. hunti* shows 3 distal setae, 1 of them annulated, while in *P. tainae* this segment bears 2 dorsal setae and 7 or 8 distal setae.

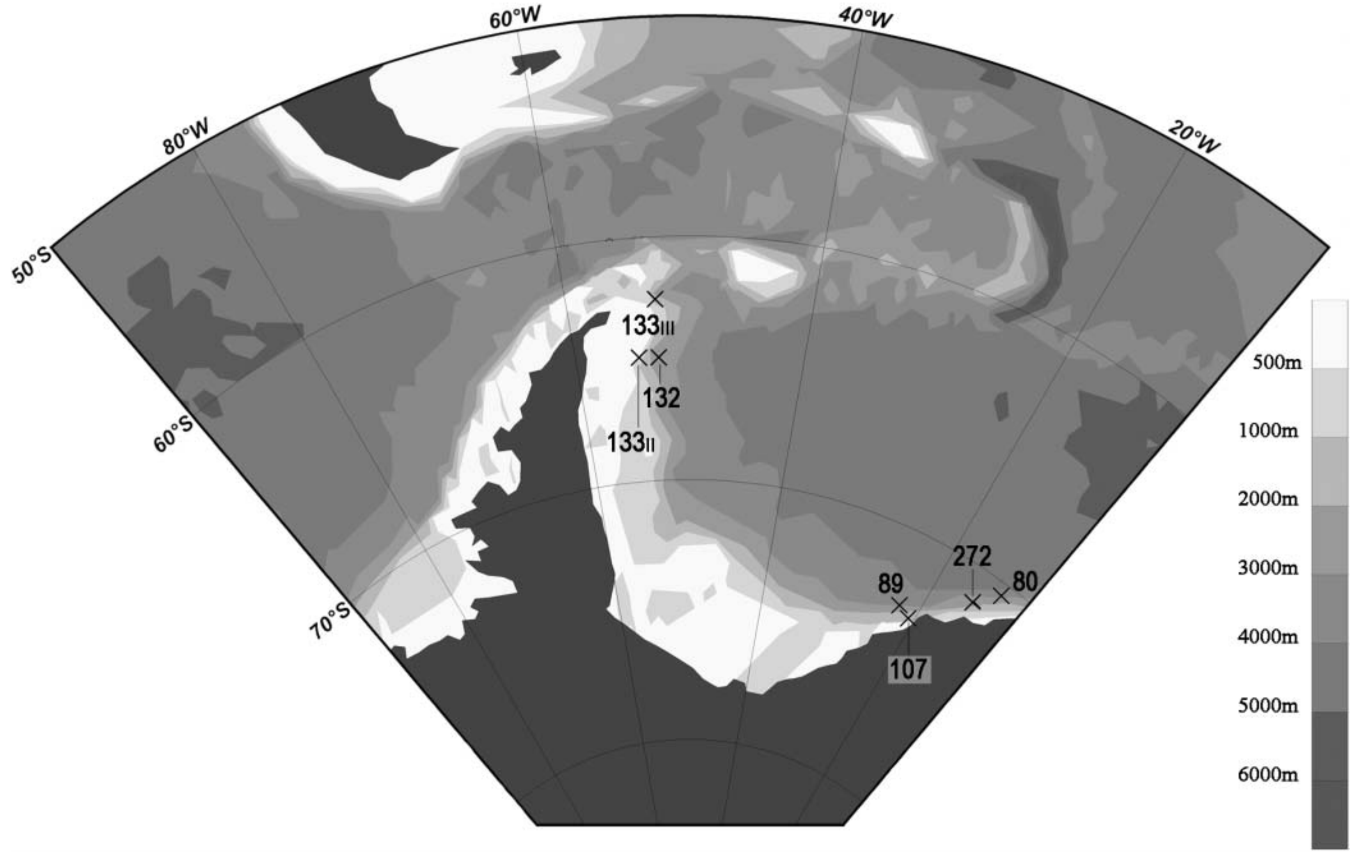


Fig. 3. Geographical distribution of *Poseidonamicus yasuharai* sp. nov. Arabic numerals are the station numbers as in the cruise reports (see Table 1 for details).

4. Fifth limb. In *P. yasuharai*, segment I dorsally has 2 annulated setae, but in *P. hunti* and in *P. tainae* only 1 simple seta is present.
5. Seventh limb. Dorsally on segment I, *P. yasuharai* carries 1 long annulated seta, distally 1 annulated seta and ventrally a seta-like, annulated exopodite. In contrast, *P. hunti* dorsally has 1 long seta, distally 2 setae (1 of them annulated) and ventrally a seta-like exopodite, while *P. tainae* bears dorsally 1 reduced and 1 simple setae and distally 1 seta.

SYSTEMATIC DESCRIPTIONS

(Higher classification based on Horne *et al.*, 2002)

Class **Ostracoda** Latreille, 1806

Subclass **Podocopa** Sars, 1866
Order **Podocopida** Sars, 1866
Suborder **Cytherocopina** Baird, 1850
Superfamily **Cytheroidea** Baird, 1850
Family **Thaerocytheridae** Hazel, 1967
Genus *Bradleya* Hornibrook, 1952

Type species. *Cythere arata* Brady, 1880 (by original designation).

Additional species. 166 species have been assigned to *Bradleya*. For a list of these species, see the 'World Register of Marine Species' website (WoRMS, www.marinespecies.org).

Diagnosis. This is slightly modified after Benson (1972). In lateral view, valves 'subrectangular to subquadrate with broadly rounded anterior margin and squared posterior margin without noticeable caudal process; dorsal and ventrolateral carinae' present. 'Surface smooth to strongly reticulate with celate overgrowth (in the type-species); the reticular pattern is grid like rather than radiate and consistent within species, with variation' in adult 'due to increased coarseness of some muri and loss of others. Most species have traces of a bridge or box-girder construction within the pattern of the anterior field of the reticulum, extending from the region of the suppressed muscle-scar node (absent in smooth forms) to the ocular ridge, which extends from the position of the eye tubercule (absent in blind species) to join with the ventrolateral ridge. In some species a median ridge, post-adjacent to muscle scar node, is formed from emphasis of one set of longitudinal muri and may be joined with the dorsal carina at the posterior to form a postero-dorsal loop. This feature becomes well developed as the lower element of the bridge decreases in size. Several species having this feature are considered together as the new subgenus *Quasibradleya*. Hinge hemi- to holamphidont commonly with a lobed posterior tooth; vestibule absent. Muscle-scar pattern thaerocytherid with two frontal scars'. Antennulae with five segments, exopodite of mandibula with 5 setae. Antennae with long exopodite. Distal region of segment I of fifth to seventh limbs strongly sclerotized (= knee apparatus of some authors, e.g. Benson, 1972).

Bradleya mesembrina Mazzini, 2005
(Pl. 1, figs A–G; Fig. 1; Tables 1–2)

2005 *Bradleya mesembrina* Mazzini: 81–83, figs 47.A–K, 48.B.
2009 *Bradleya mesembrina*, Yasuhara *et al*.: 918, figs 4.8, 4.9.

Diagnosis. From Mazzini (2005). 'Medium-sized *Bradleya* with thick muri. Fossae fused in the posterior area. Postero-dorsal and anteroventral carinae pronounced. Weak ocular ridge. Surface of the fossae covered with a secondary reticulation, formed by small chains of circular pits.'

Material. 31 live specimens, 14 subfossil valves.

- # 42-2-E, ANDEEP I: 1 left valve, ZMH K-42452a. 1 live adult female, 1 live juvenile (?male), in alcohol, ZMH K-42452b. 1 left valve, 1 right valve of the 1 live male (SNB 0890) on a micropalaeontological slide ZMH K-42452d, plus its dissected soft parts on a glass slide, ZMH K-42452c.
- # 42-2-E+S, ANDEEP I: 1 left valve, 1 right valve of the live adult female SNB 0891 on a micropalaeontological slide ZMH K-42452f, plus its dissected soft parts on a glass slide, ZMH K-42452e.
- # 42-2-S, ANDEEP I: 2 live adult males, 1 live adult female, in alcohol, ZMH K-42452g.
- # 46-7-S, ANDEEP I: 2 ?live adult females, 3 live adult males, in alcohol, ZMH K-42496.
- # 80-9-S, ANDEEP III: 1 left valve on a micropalaeontological slide, ZMH K-42498.
- # 81-9-E, ANDEEP III: 1 right valve on a micropalaeontological slide, ZMH K-42499.
- # 129-2-S, ANDEEP I: 1 left valve on a micropalaeontological slide, 1 right valve, ZMH K-42455.
- # 139-6-E, ANDEEP II: 1 left valve, 1 right valve of the live adult male SNB 0400 on a micropalaeontological slide ZMH K-42602a, plus its dissected soft parts on a glass slide, ZMH K-42602b.
- # 141-10-E, ANDEEP II: 1 right valve on a micropalaeontological slide ZMH K-42483. 1 adult closed, subfossil carapace, ZMH K-42494a. 1 left valve, 1 right valve of the live adult male SNB 0618 on a micropalaeontological slide ZMH K-42494e, plus its dissected soft parts on a glass slide, ZMH K-42494f.
- # 141-10-S, ANDEEP II: 2 live adult males in alcohol, ZMH K-42494b. 1 left valve, 1 right valve of the live adult female SNB 0889 on a micropalaeontological slide ZMH K-42494c, plus its dissected, fragmented soft parts on a glass slide, ZMH K-42494d.
- # 143-1-E, ANDEEP II: 1 right valve, 2 closed subfossil carapaces (1 of them SNB 0080), ZMH K-42492a; 4 live males, 2 live females, ZMH K-42492b.
- # 143-1-S, ANDEEP II: 1 adult live male, 1 live juvenile, in alcohol, ZMH K-42492c.
- # 154-9-E, ANDEEP III: 1 right valve on a micropalaeontological slide, ZMH K-42454.
- # 171, EASIZ II: 1 left valve, 1 right valve of the live adult male SNB 0888 on a micropalaeontological slide ZMH K-42489a, plus its dissected soft parts on a glass slide, ZMH K-42489b.
- # 272, EASIZ II: 1 adult live male, 1 live adult female, 2 live (A-1), in alcohol, ZMH K-42491.
- # 323, EASIZ II: 1 live female, in alcohol, ZMH K-42490.

Dimensions. *Adult males* – SNB 0888 (ZMH K-42489a), LV L 0.96 mm, H 0.59 mm. SNB 0889 (ZMH K-42494c) LV L 1.04 mm, H 0.62 mm. SNB 0890 (ZMH K-42452d), LV L 1.00 mm, H 0.62 mm. *Adult females* – SNB 0891 (ZMH K-42452f), LV L 1.07 mm, H 0.64 mm. (ZMH K-42492b) LV L 0.92 mm, H 0.57 mm. (ZMH K-42491) LV L 1.08 mm, H 0.64 mm. (ZMH K-42490) LV L 0.98 mm, H 0.62 mm. *Juveniles* – (A-?1) (ZMH K-42452b), LV L 0.84 mm, H 0.55 mm.

Distribution. (Fig. 1) Late Pleistocene to Recent. Antarctic and Subantarctic zones of the Southern Ocean. (1) Holocene, Southern Tasman Rise, 1636–3685 m (Mazzini, 2005). (2) Late Pleistocene and Holocene, Subantarctic zone of the Atlantic Sector of the Southern Ocean, 2532 m (Yasuhara *et al*., 2009). (3) Recent, Antarctic zone of the Atlantic Sector of the Southern Ocean (off Southern Sandwich Islands, Eastern Weddell Sea and Scotia Sea), 231–4420 m (herein).

Remarks. The geographical and bathymetric distribution of *B. mesembrina* is herein extended to the Antarctic zone of the Southern Ocean, and to shallower (shelf) and deeper (abyssal) habitats.

Genus *Harleya* Jellinek & Swanson, 2003

Type species. *Harleya davidsoni* Jellinek & Swanson, 2003 (original designation).

Additional species. *Poseidonamicus ansoni* Whatley, Moguilevsky, Ramos & Coxill, 1998.

Diagnosis. From Jellinek & Swanson (2003). A 'genus with large, subquadrate to sub-rectangular and heavily calcified species, ornamented with fine striae, often forming a polygonal, irregular and internally punctate meshwork, a holamphidont hinge (paramphidont in juveniles) and variable hermicytherid pattern of central muscle scars'.

Harleya ansoni (Whatley, Moguilevsky, Ramos & Coxill, 1998)
(Pl. 1, fig. H; Pl. 2; Fig. 1; Tables 1–2)

1998 *Poseidonamicus ansoni* Whatley, Moguilevsky, Ramos & Coxill: 132, pl. 5.12–5.16.

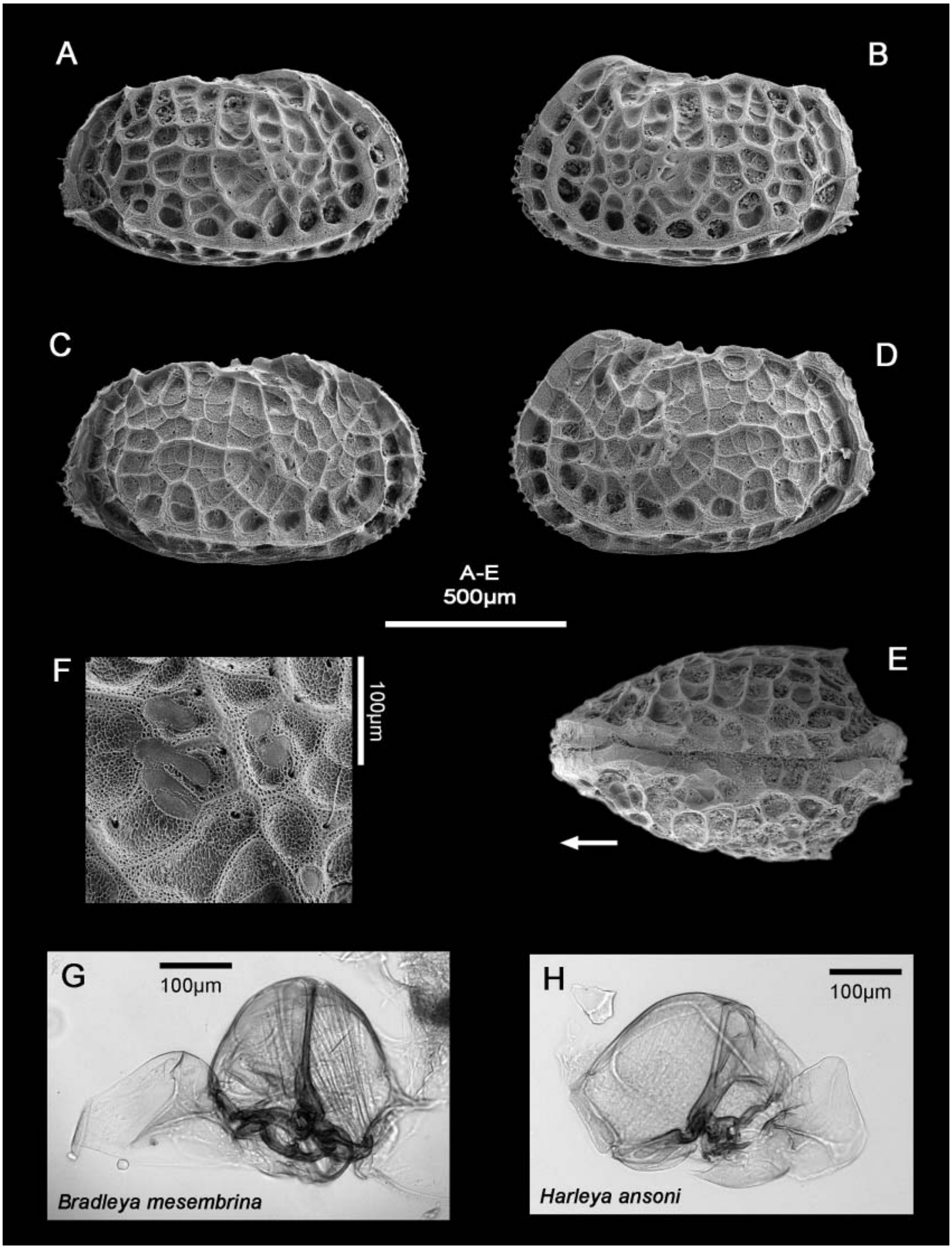
Diagnosis. Modified after Whatley *et al*. (1998: 132). Left valve sub-rectangular in lateral view, with strongly marked dorsal and postero-ventral cardinal angles. Primary reticulation selate but conspicuous, secondary reticulation either slight or covered by selation. Both valves postero-ventrally with one to three long spines, plus four to six short spines.

Species	SNB number	Sex, Age	type	Stationa	Slides	Collection numbers	Comments
Harleya ansoni (Whatley *et al.*, 1998)	SNB 0212	M	no	ANDEEP III, # 133-2-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42468a (2 V), ZMH K-42468b (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0080	A		ANDEEP II, # 143-1-E	2 V on 1 MP	ZMH K-42492a (2 V)	No soft parts
Bradleya mesembrina Mazzini, 2005	SNB 0400	M		ANDEEP II, # 139-6-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42602a (2 V), ZMH K-42602b (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0618	M		ANDEEP II, # 141-10-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42494e (2 V), ZMH K-42494f (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0888	M		EASIZ II, # 171	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42489a (2 V), ZMH K-42489b (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0889	F		ANDEEP II, # 141-10-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42494c (2 V), ZMH K-42494d (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0890	M		ANDEEP I, # 42-2-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42452d (2 V), ZMH K-42452c (SP)	
Bradleya mesembrina Mazzini, 2005	SNB 0891	F		ANDEEP I, # 42-2-E+S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42452f (2 V), ZMH K-42452e (SP)	
Poseidonamicus hunti Brandão & Päplow, sp. nov.	SNB 0112	F	paratype	ANDEEP III, # 110-8-U	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42473a (2 V), ZMH K-42473b (SP)	
Poseidonamicus hunti Brandão & Päplow, sp. nov.	SNB 0880	M	paratype	ANDEEP III, # 81-8-Ü	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42464a (2 V), ZMH K-42464b (SP)	
Poseidonamicus hunti Brandão & Päplow, sp. nov.	SNB 0884	M	paratype	ANDEEP II, # 136-4-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42475a (2 V), ZMH K-42475b (SP)	
Poseidonamicus hunti Brandão & Päplow, sp. nov.	SNB 0885	F	paratype	ANDEEP II, # 136-4-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42467a (2 V), ZMH K-42467b (SP)	
Poseidonamicus hunti Brandão & Päplow, sp. nov.	SNB 0886	M	**holotype**	ANDEEP II, # 136-4-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42466a (2 V), ZMH K-42466b (SP)	
Poseidonamicus tainae Brandão, sp. nov.	SNB 0302		paratype	ANDEEP II, # 131-3-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42457c (2 V), ZMH K-42457d (SP)	Frag-mented soft parts
Poseidonamicus tainae Brandão, sp. nov.	SNB 0396	F	paratype	ANDEEP II, # 138-6-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42484a (2 V), ZMH K-42484b (SP)	
Poseidonamicus tainae Brandão, sp. nov.	SNB 0881	F	paratype	ANDEEP III, # 102-13-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42465a (2 V), ZMH K-42465b (SP)	

Species	SNB number	Sex, Age	type	Station[a]	Slides	Collection numbers	Comments
Poseidonamicus tainae Brandão, sp. nov.	SNB 0882	M	**holotype**	ANDEEP I, # 129-2-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42456b (2 V), ZMH K-42456c (SP)	
Poseidonamicus tainae Brandão, sp. nov.	SNB 0883	F	paratype	ANDEEP II, # 134-4-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42478a (2 V), ZMH K-42478b (SP)	
Poseidonamicus sp. cf. *P. tainae* Brandão, sp. nov.	SNB 0627	F		ANDEEP III, # 16-11	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42487a (2 V), ZMH K-42487b (SP)	
Poseidonamicus sp. cf. *P. tainae* Brandão, sp. nov.	SNB 0630	F		ANDEEP III, # 16-10-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42480a (2 V), ZMH K-42480b (SP)	Dried soft parts
Poseidonamicus sp. cf. *P. tainae* Brandão, sp. nov.	SNB 0879	F		ANDEEP I, # 43-8-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42479a (2 V), ZMH K-42479b (SP)	
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0006	F	paratype	EASIZ II, # 272	SP on 2 glass slides, 2 V on 1 MP	ZMH K-42460a (2 V), ZMH K-42460b (SP)	
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0210	F	paratype	ANDEEP III, # 133-2-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42453b (2 V), ZMH K-42453c (SP)	
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0211	M	**holotype**	ANDEEP III, # 133-2-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42469a (2 V), ZMH K-42469b (SP)	
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0315	J	paratype	EASIZ II, # 89	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42481a (2 V), ZMH K-42481b (SP)	Dried soft parts
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0626	M	paratype	ANDEEP III, # 80-9-E	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42474a (2 V), ZMH K-42474b (SP)	
Poseidonamicus yasuharai Brandão & Päplow, sp. nov.	SNB 0887	M	paratype	ANDEEP II, # 132-2-S	SP on 1 glass slide, 2 V on 1 MP	ZMH K-42459c (2 V), ZMH K-42459b (SP)	

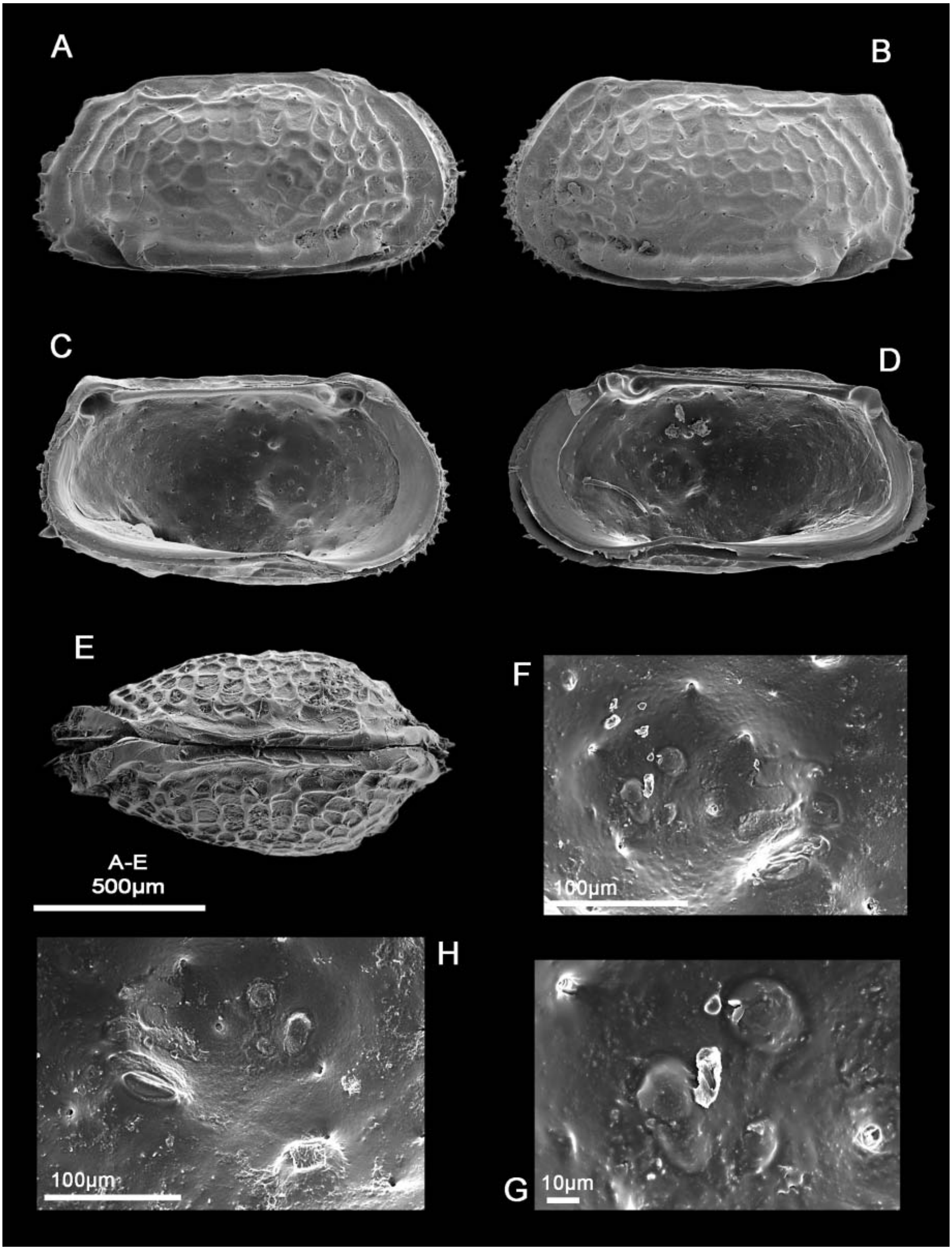
[a] For details of the station, see Table 1.
A, adult; E (after a station number), epinet of the epibenthic sledge; F, adult female; J, juvenile; M, adult male; MP, micropaleontological slide; S (after a station number), supranet of EBS; SNB, specimen number catalogued by first author; SP, soft parts; V, valve(s).

Table 2. Specimen catalogue.



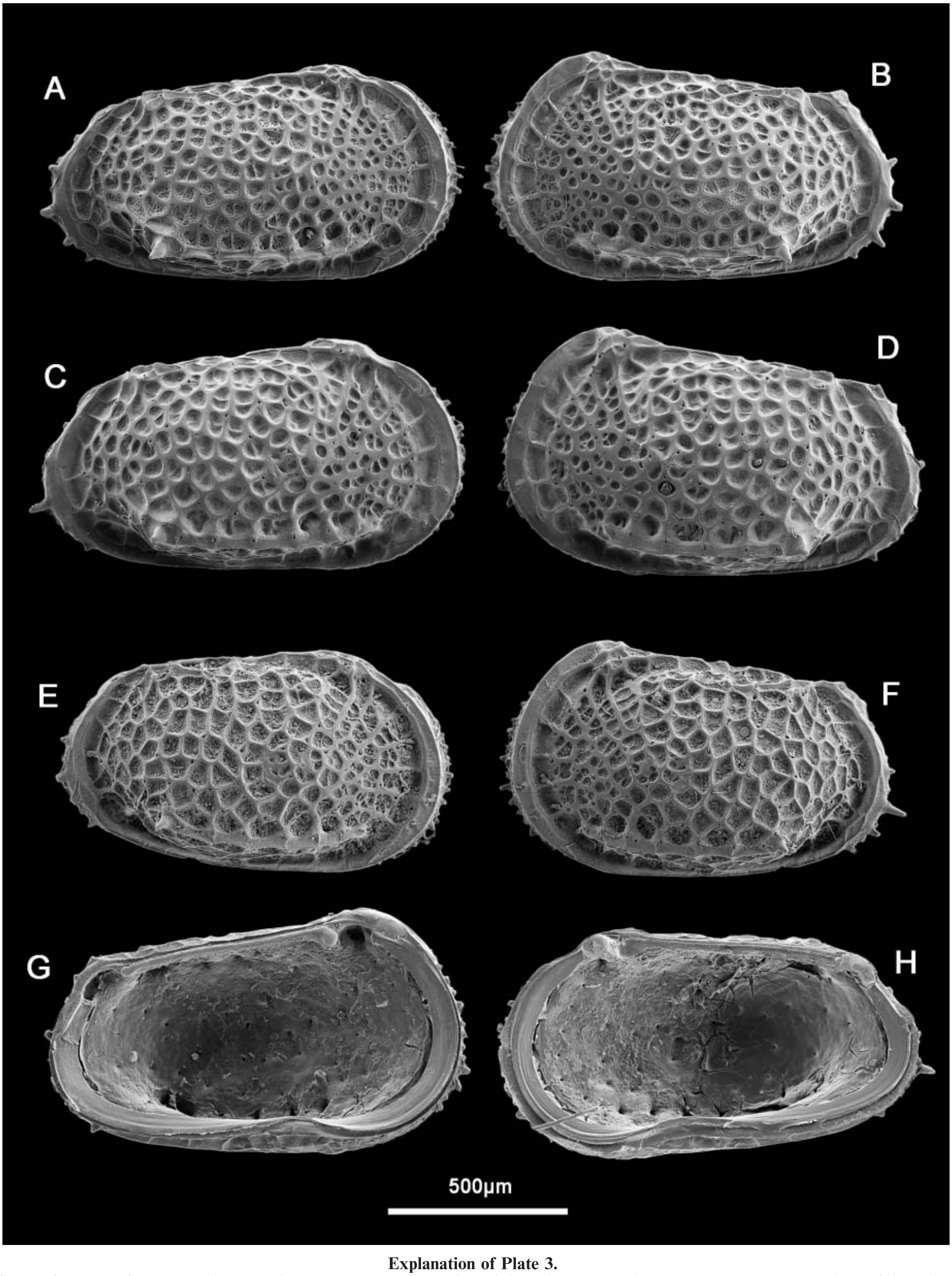
Explanation of Plate 1.

Valves and copulatory limb of *Bradleya mesembrina* Mazzini, 2005 and *Harleya ansoni* (Whatley *et al*., 1998). **figs A–G**. *Bradleya mesembrina* Mazzini, 2005. **A, B, F**. Live adult male (SNB 0888, ZMH K- 42489b), Recent, EASIZ II, sample 171, Weddell Sea, 12/02/1998, epibenthic sledge trawled from 75°26.7′S, 26°39.9′W, 231 m to 75°26.9′S, 26°39.3′W, 231 m: **A,** right valve, external view; **B,** left valve, external view; **F,** detail of A. **C, D**. Live adult male (SNB 0890, ZMH K-42452d), Recent, ANDEEP I, sample 42-2-E, Scotia Sea, 27.01.02, epibenthic sledge trawled from 59° 39.88′ S, 57° 35.94′ W, 3681 m to 59° 40.32′ S, 57° 35.64′ W, 3690 m: **C,** right valve, external view; **D,** left valve, external view. **E**. Subfossil (SNB 0080, ZMH K-42492a), Recent, ANDEEP II, sample 143-1-E, off South Sandwich Islands, 25.03.2002, epibenthic sledge trawled from 58°44.91′S, 25°10.11′W, 801 m to 58°44.45′S, 25°10.66′W, 753 m: closed, subfossil carapace, dorsal view. **G**. Live adult male (SNB 0400, ZMH K-42602a), copulatory limb, Recent, ANDEEP II, sample 139-6-E, off South Sandwich Islands, 20/03/2002, epibenthic sledge trawled from 58°13.45′S, 24°23.04′W, 3991 m to 58°14.15′S, 24°21.21′W, 3947 m. **fig. H**. *Harleya ansoni* (Whatley *et al*., 1998): live adult male (SNB0212, ZMH K-42468a), copulatory limb, Recent, ANDEEP III, sample 133-2-E, Weddell Sea, 16.03.2005, epibenthic sledge trawled from 62°46.73′S, 53°2.57′W, 1582 m to 62°46.34′S, 53°4.14′W, 1581 m.



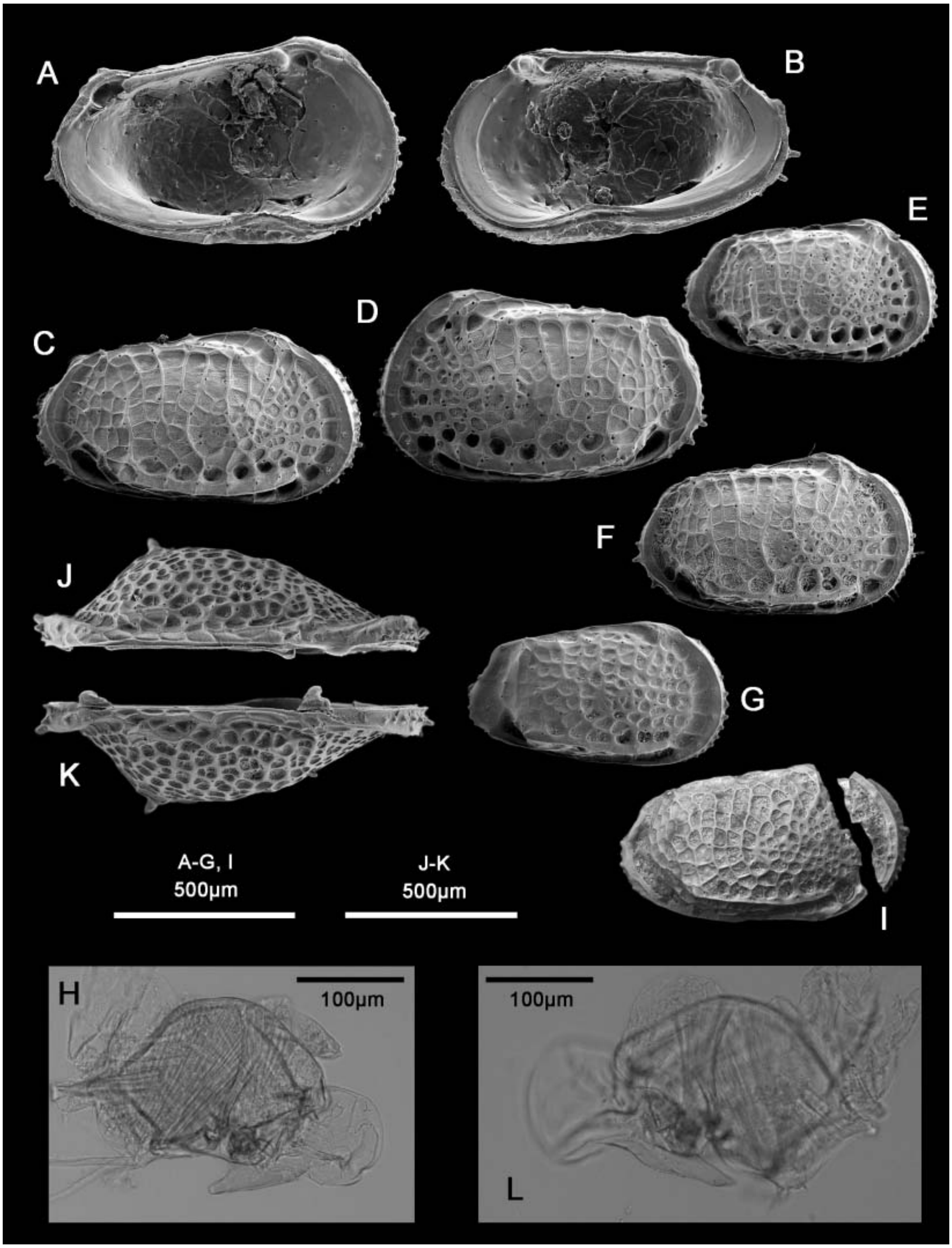
Explanation of Plate 2.

Valves of *Harleya ansoni* (Whatley *et al*., 1998). Live adult male (SNB0212, ZMH K-42468a). **fig. A**. Right valve, external view. **fig. B**. Left valve, external view. **fig. C**. Left valve, internal view. **fig. D**. Right valve, internal view. **fig. F**. Frontal and adductor muscle scars of D. **fig. G**. Detail of the four frontal muscle scars of D. **fig. H**. Three frontal and four adductor muscle scars of C. Recent, ANDEEP III, sample 133-2-E, Weddell Sea, 16.03.2005, epibenthic sledge trawled from 62°46.73′S, 53°2.57′W, 1582 m to 62°46.34′S, 53°4.14′W, 1581 m. **fig. E**. Adult carapace with dried soft parts (ZMH K-42488b) (both valves broken while removing from SEM stub), dorsal view. Recent, EASIZ II, sample 89, Eastern Weddell Sea, 04.02.98, epibenthic sledge trawled from 73°27.5′ S, 22°45.7′W to 73°27.3′ S, 22°45.6′ W, 1639 m. figs A–E scale bar 500 µm.



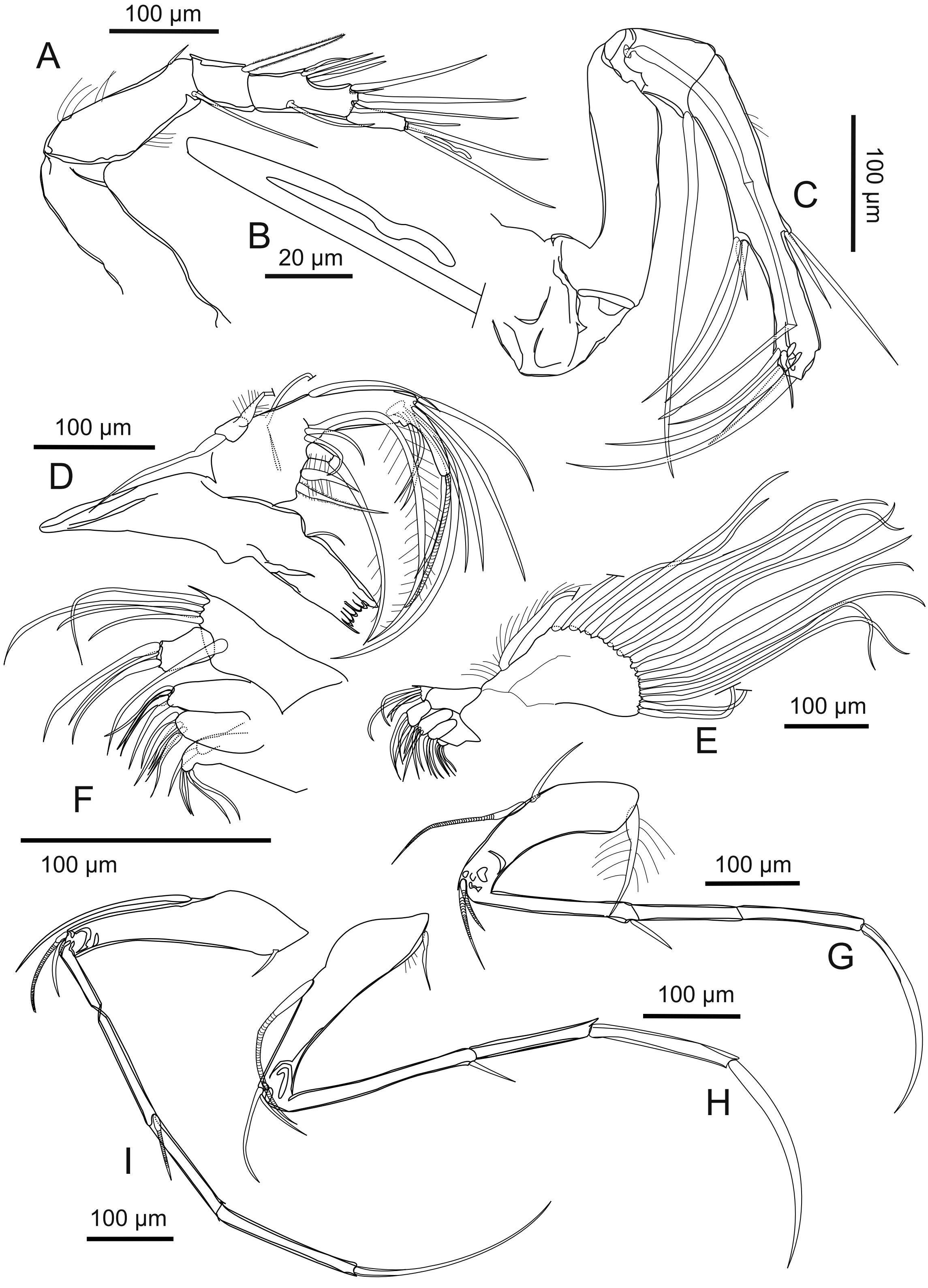
Explanation of Plate 3.

Valves of *Poseidonamicus hunti* Brandão & Päplow, sp. nov. **figs A, B**. Live adult male paratype (SNB 0884, ZMH K-42475a): **A,** right valve, external view; **B,** left valve, external view. **figs C, D, G, H**. Live adult female paratype (SNB 0885, ZMH K-42467a): **C,** right valve, external view; **D,** left valve, external view; **G,** left valve, internal view; **H,** right valve, internal view. Recent, ANDEEP II, sample # 136-4-S, Weddell Sea, 12.03.2002, epibenthic sledge trawled from 64°1.46′S, 39°9.86′W, 4782 m to 64°1.51′S, 39°6.88′W, 4745 m. figs E, F. Live adult female paratype (SNB 0879, ZMH K-42479a): **E,** right valve, external view; **F,** left valve, external view. Recent, ANDEEP I, sample # 43-8-S, Scotia Sea, 04.02.2002, epibenthic sledge trawled from 60°26.48′S, 56°4.00′W, 3953 m to 60°27.24′S, 56°5.25′W, 3962 m.



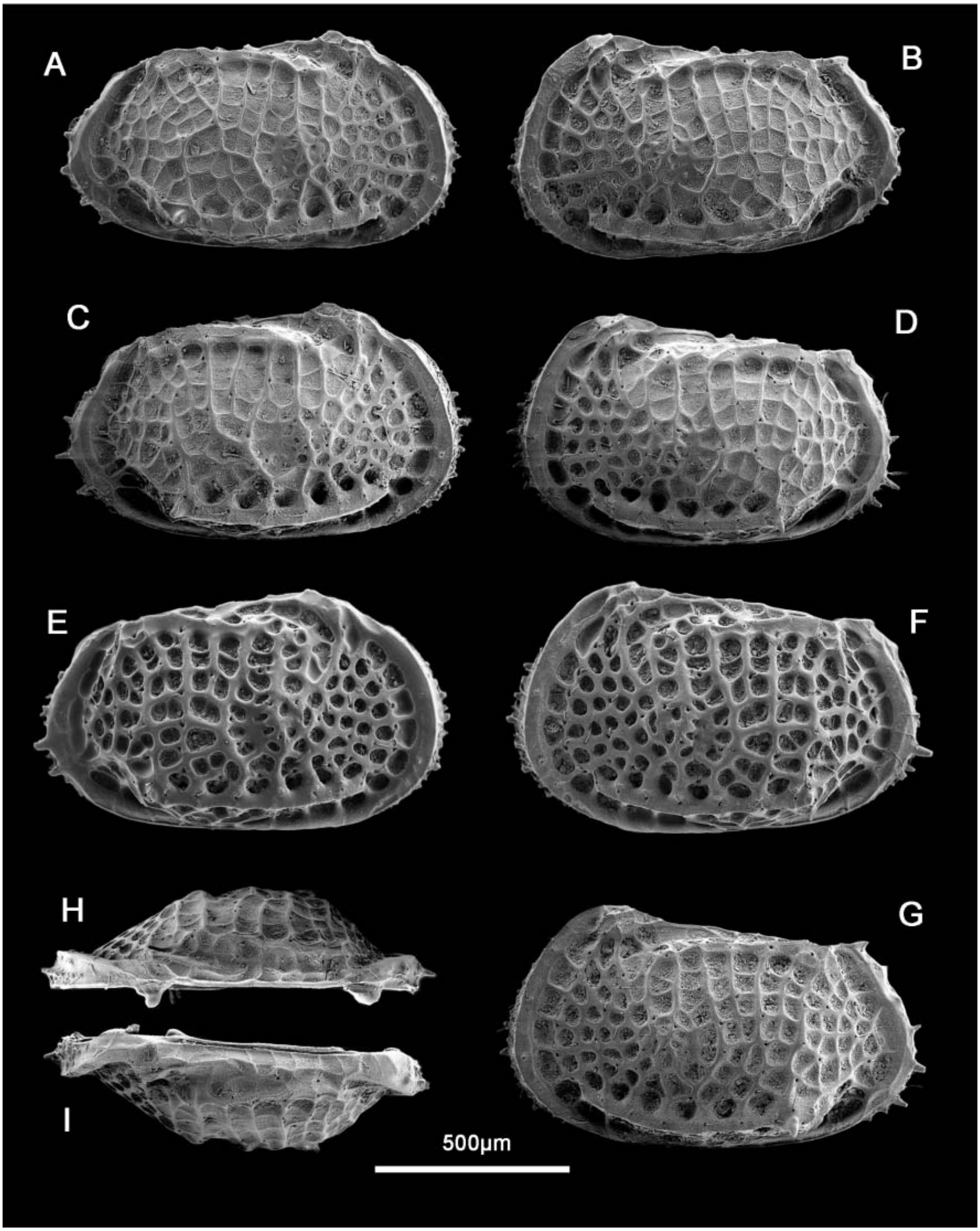
Explanation of Plate 4.

Valves and copulatory limbs of *Poseidonamicus hunti* Brandão & Päplow sp. nov., *Poseidonamicus tainae* Brandão sp. nov. and *Poseidonamicus viminea* (Brady, 1880) *nomen nudum*. **figs A, B**. *Poseidonamicus tainae* Brandão sp. nov., live adult female paratype (SNB 0883, ZMH K-42478a): **A,** right valve, internal view; **B,** left valve, internal view. Recent, ANDEEP II, sample #134-4-S, Weddell Sea, 09.03.2002, epibenthic sledge trawled from 65°19.71′S, 65°19.05′S, 4059 m to 48°6.27′W, 48°2.92′W, 4069 m. **figs C–G**. *Poseidonamicus tainae* Brandão sp. nov., subfossil paratypes (ZMH K-42470a), external views: **C, E, F, G,** right valves; **D,** left valve. Recent, ANDEEP I, sample 41-3-E+S, Scotia Sea, 26-27.01.02, epibenthic sledge trawled from 59°21.97′S, 60°4.27′W, 2380 m to 59°22.55′S, 60°4.01′W, 2359 m. **fig. H**. *Poseidonamicus tainae* Brandão sp. nov., live adult male holotype (SNB 0882, ZMH K-42456c), copulatory limb. Recent, ANDEEP I, sample 129-2-S, Scotia Sea, 23.02.2002, epibenthic sledge trawled from 59°52.55′S, 59°57.26′W, 3631 m to 59°52.20′S, 59°58.63′W, 3637 m. **fig. I**. *Poseidonamicus viminea* (Brady, 1880) *nomen dubium*, broken lectotype, right valve, external view. Recent, HMS *Challenger*, station 146, Southern Ocean between Prince Edward and Crozet islands, 46°46′S, 45°31′E, 1375 fathoms (2515 m), Natural History Museum, London (BM 81.5.33). **figs J, K**. *Poseidonamicus hunti* Brandão & Päplow sp. nov., live adult male paratype (SNB 0884, ZMH K-42475a): **J,** left valve, dorsal view; **K,** right valve, dorsal view. **fig. L**. *Poseidonamicus hunti* Brandão & Päplow sp. nov., live adult male holotype (SNB 0886, ZMH K-42466b), copulatory limb. Recent, ANDEEP II, sample #136-4-S, Weddell Sea, 12.03.2002, epibenthic sledge trawled from 64°1.46′S,39°9.86′W, 4782 m to 64°1.51′S, 39°6.88′W, 4745 m.



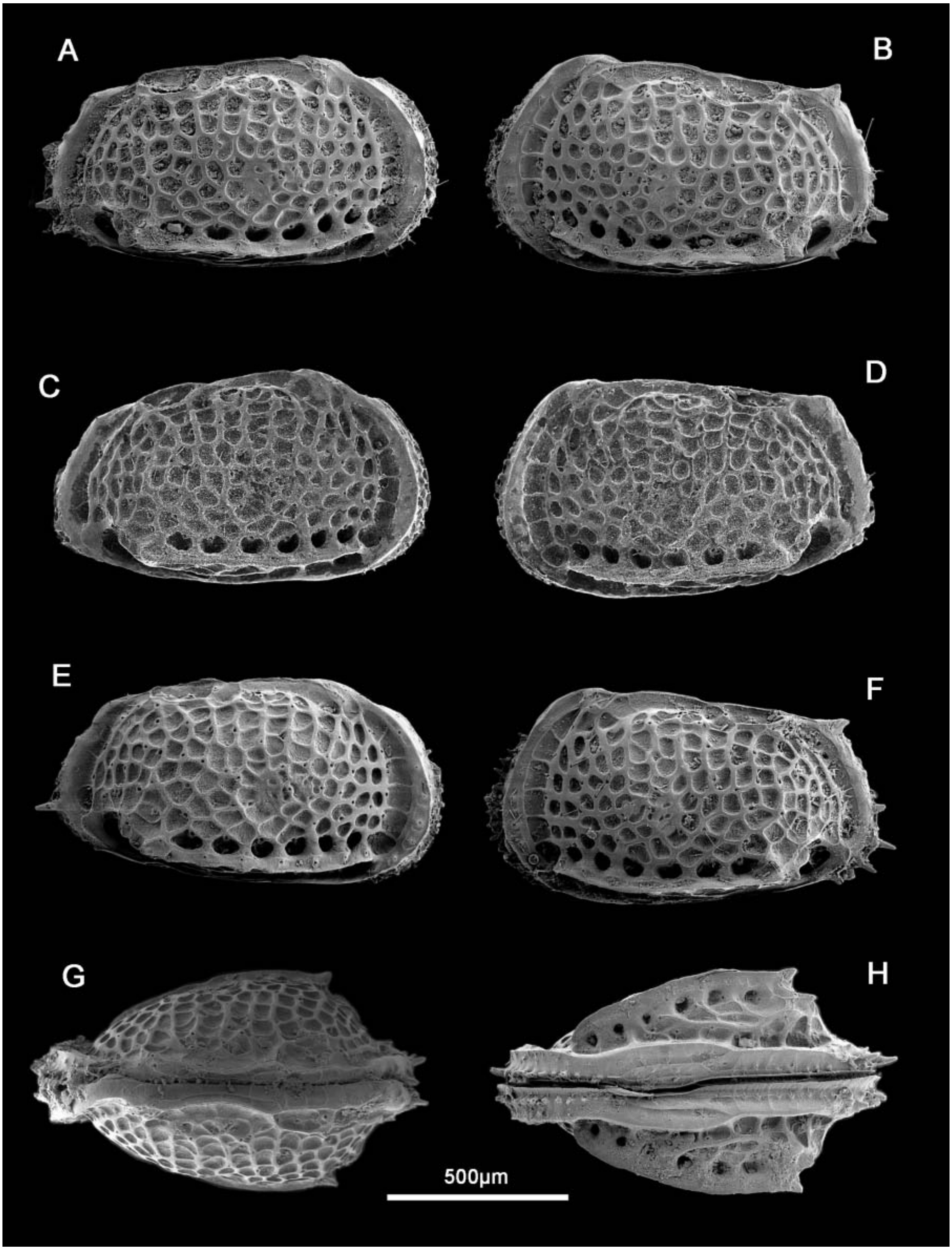
Explanation of Plate 5.

Limbs of the holotype of *Poseidonamicus hunti* Brandão & Päplow sp. nov. (SNB 0886, ZMH K-42466b). **fig. A**. antennula; **fig. B**. modified structure ('1fsc' in chaetotaxy formula), possibly an aesthetasc fused to a claw; **fig. C**. antenna; **fig. D**. mandibula; **fig. E**. maxillula; **fig. F**. endites and palp of maxillula; **figs G–I**. fifth to seventh limbs, respectively. Recent, ANDEEP II, sample #136-4-S, Weddell Sea, 12.03.2002, epibenthic sledge trawled from 64°1.46′S, 39°9.86′W, 4782 m to 64°1.51′S, 39°6.88′W, 4745 m.



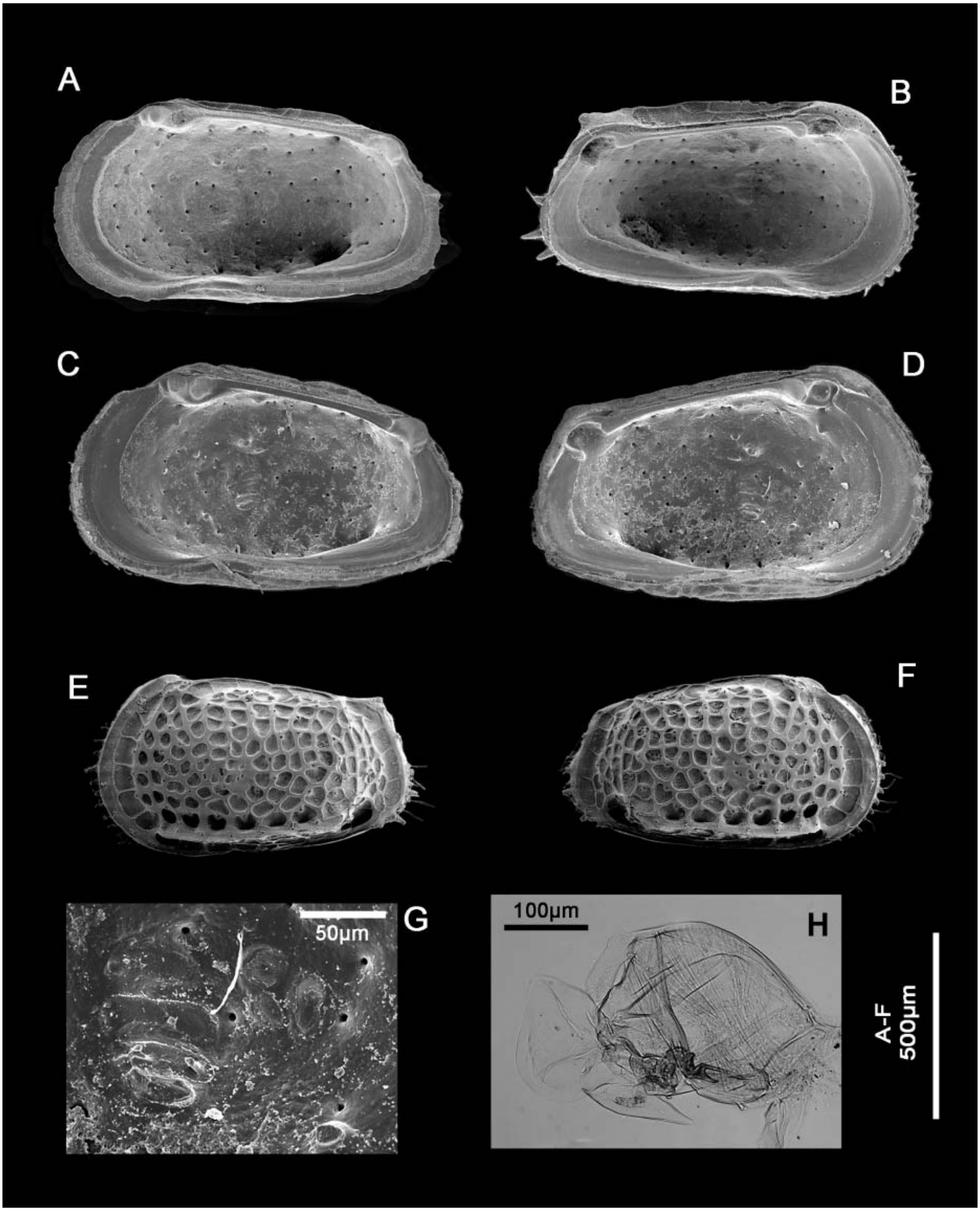
Explanation of Plate 6.

Valves of *Poseidonamicus tainae* Brandão sp. nov. and *Poseidonamicus* sp. cf. *P. tainae* Brandão sp. nov. **figs A, B**. *Poseidonamicus tainae* Brandão sp. nov., live adult male holotype (SNB 0882, ZMH K-42456b): **A,** right valve, external view; **B,** left valve, external view. **fig. C**. *Poseidonamicus tainae* Brandão sp. nov., subfossil paratype, right valve, external view. Recent, ANDEEP I, sample 129-2-S, Scotia Sea, 23.02.2002, epibenthic sledge trawled from 59°52.55′S, 59°57.26′W, 3631 m to 59°52.20′S, 59°58.63′W, 3637 m. **figs D, H, I**. *Poseidonamicus tainae* Brandão sp. nov., subfossil paratypes (ZMH K-42457b): **D,** left valve, external view; **H,** right valve, dorsal view; **I,** left valve, dorsal view. Recent, ANDEEP II, sample 131-3-E, Weddell Sea, 05.03.2002, epibenthic sledge trawled from 65°19.19′S, 51°32.54′W, 3055 m to 65°19.99′S, 51°31.23′W, 3050 m. **fig. G**. *Poseidonamicus tainae* Brandão sp. nov., subfossil paratype (ZMH K-42476), left valve, external view. Recent, ANDEEP III, sample 81-9-E, Weddell Sea, 24.02.2005, epibenthic sledge trawled from 70°31.08′S, 14°34.83′W, 4420 m to 70°32.32′S, 14°34.94′W, 4384 m. **figs E, F**. *Poseidonamicus* sp. cf. *P. tainae* Brandão sp. nov., live adult female (SNB 0627, ZMH K-42487a): **E,** right valve, external view; **F,** left valve, external view. Recent, ANDEEP III, sample 16-11, Cape Basin, 26.01.2005, epibenthic sledge trawled from 41°7.66′S, 9°56.26′E, 4727 m to 41°7.42′S, 9°54.92′E, 4730 m.



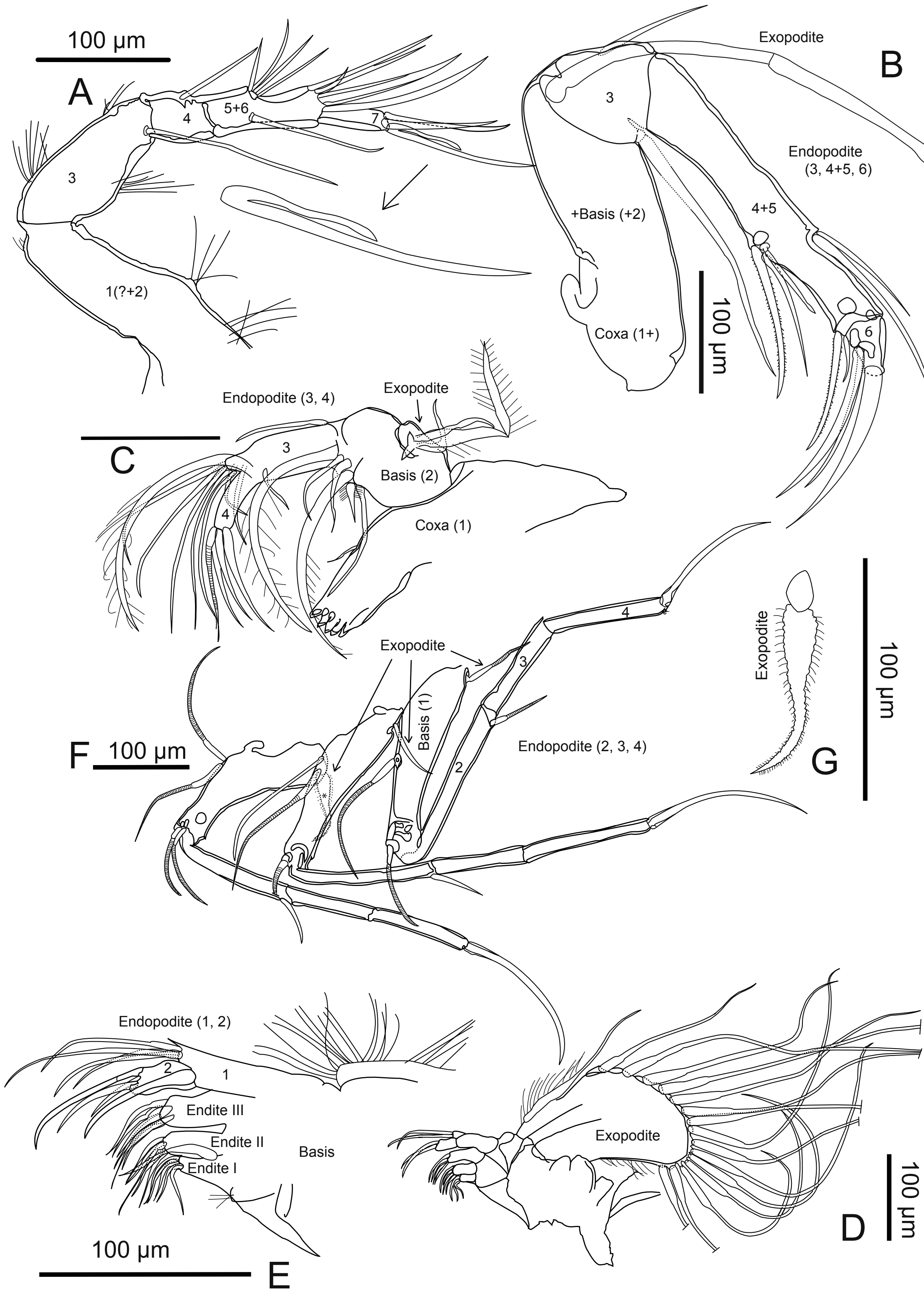
Explanation of Plate 7.

Valves of *Poseidonamicus yasuharai* Brandão & Päplow sp. nov. **figs A, B, G, H**. Live adult male holotype (SNB 0211, ZMH K-42469a), external views: **A,** right valve; **B,** left valve; **G,** subfossil carapace, dorsal view, **H,** subfossil carapace, ventral view. Type locality: Recent, ANDEEP III, sample 133-2, Weddell Sea, 16.03.2005, epibenthic sledge trawled from 62°46.73′S, 53°2.57′W, 1582 m to 62°46.34′S, 53°4.14′W, 1581 m. **figs C, D**. Live adult female paratype (SNB 0006, ZMH K-42460a), external views: **C,** right valve; **D,** left valve. Recent, EASIZ II, sample 272, Weddell Sea, 26.02.1998, epibenthic sledge trawled from 71°28.8′S, 15°10.4′W, 2076 m to 71°29.0′S, 15°10.3′W, 2003 m. **figs E, F**. Subfossil paratypes (ZMH K-42463), external views: **E,** right valve, **F,** left valve. Recent, EASIZ II, sample 107, Weddell Sea, 06.02.1998, epibenthic sledge trawled from 73°34.8′S, 22°38.4′W, 934 m to 73°34.9′S, 22°38.9′W, 924 m.



Explanation of Plate 8.

Valves and male copulatory limb of *Poseidonamicus yasuharai* Brandão & Päplow sp. nov. **figs A, B**. Subfossil paratypes (ZMH K-42458a), internal views: **A,** right valve, **B,** left valve. Recent, ANDEEP II, sample 133-3-E, Weddell Sea, 07.03.2002, epibenthic sledge trawled from 65°20.40′S, 54°14.11′W, 1123 m to 65°20.09′S, 54°14.36′W, 1123 m. **figs C, D, G**. Live adult female paratype (SNB 0006, ZMH K-42460a): **C,** right valve, internal view; **D,** left valve, internal view; **G,** detail of adductor muscle scar pattern of D. Recent, EASIZ II, sample 272, Weddell Sea, 26.02.1998, epibenthic sledge trawled from 71°28.8′S, 15°10.4′W, 2076 m to 71°29.0′S, 15°10.3′W, 2003 m. **figs E, F**. Live juvenile paratype (SNB 0315, ZMH K-42481a): **E,** left valve, external view; **F,** right valve, external view. Recent, EASIZ II, sample 89, Weddell Sea, 04.02.1998, epibenthic sledge trawled from 73°27.5′S, 22°45.7′W, 1639 m to 73°27.3′S, 22°45.6′W, 1633 m. **fig. H**. Live adult male paratype (SNB 0626, ZMH K-42474a): copulatory limb. Recent, ANDEEP III, sample 80-9, Weddell Sea, 23.02.2005, epibenthic sledge trawled from 70°38.46′S, 14°42.87′W, 3136 m to 70°39.19′S, 14°43.44′W, 3102 m.



Explanation of Plate 9.

Limbs of the holotype of *Poseidonamicus yasuharai* Brandão & Päplow sp. nov. (SNB 0211, ZMH K-42469a). **fig. A**. antennula; **fig. B**. antenna; **fig. C**. mandibula; **fig. D**. maxillula; **fig. E**. endites and palp of maxillula; **fig. F**. fifth to seventh limbs; **fig. G**. exopodite of the fifth limb. Recent, ANDEEP III, sample 133-2, Weddell Sea, 16.03.2005, epibenthic sledge trawled from 62°46.73′S, 53°2.57′W, 1582 m to 62°46.34′S, 53°4.14′W, 1581 m.

Material. 10 live specimens, 4 subfossil valves.

- # 133-2-E, ANDEEP III: 1 left valve, 1 right valve (coated with gold) of the live adult male SNB 0212 on a micropalaeontological slide, ZMH K-42468a, plus its dissected soft parts on a glass slide, ZMH K-42468b.
- # 89, EASIZ II: 5 live adult females, 3 live adult males, 2 live (A-?1) juveniles in alcohol, ZMH K-42488a. 2 left valves, 1 closed carapace with dried soft parts (both valves broken while removing from SEM stub) on a micropalaeontological slide, ZMH K-42488b.

Dimensions. *Adult males* – LV L 1.17–1.20 mm, H 0.59–0.64 mm. RV L 1.24 mm, H 0.61 mm. *Adult females* – LV L 1.10–1.19 mm, H 0.60–0.66 mm. *Juveniles* – LV L 0.94–1.00 mm, H 0.52 mm.

Distribution. (Fig. 1) Recent. Atlantic Sector of the Southern Ocean. Scotia Sea, 990–2370 m (Whatley *et al*., 1998). Weddell Sea, 1581–1639 m (herein).

Remarks. The male specimen SNB 0212 shows four frontal muscle scars on the right valve (Pl. 2, figs F, G) and three frontal muscle scars on the left valve (Pl. 2, fig. H). This adds variability to the original definition of *Harleya* (Jellinek & Swanson, 2003), which included solely specimens with three frontal scars. Indeed, subdivision of frontal (not to cite the adductor) scars seems to have happened independently in several ostracod lineages as, for example, the Bajocian Progonocytherinae (Pokorny, 1964). The geographical distribution of *H. ansoni* is herein extended to the Weddell Sea.

Genus *Poseidonamicus* Benson, 1972
(Pls 3–9; Figs 2–3; Tables 1–2)

Type species. *Poseidonamicus major* Benson, 1972 (original designation).

Additional species. *Poseidonamicus anteropunctatus* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus dinglei* Boomer, 1999; *Poseidonamicus hisayoae* Yasuhara, Cronin, Hunt & Hodell, 2009; *Poseidonamicus minor* Benson, 1972; *Poseidonamicus miocenicus* Benson & Peypouquet, 1983, *Poseidonamicus nudus* Benson, 1972; *Poseidonamicus ocularis* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus panopsus* Whatley & Dingle, 1989; *Poseidonamicus pintoi* Benson, 1972; *Poseidonamicus praenudus* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus pseudorobustus* Coles & Whatley, 1989, *Poseidonamicus punctatus* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus riograndensis* Benson & Peypouquet, 1983; *Poseidonamicus robustus* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus rudis* Whatley, Downing, Kesler & Harlow, 1986; *Poseidonamicus whatleyi* Dingle, 2003. *Poseidonamicus hunti* Brandão & Päplow, sp. nov.; *Poseidonamicus tainae* Brandão, sp. nov.; *Poseidonamicus yasuharai* Brandão & Päplow, sp. nov.

Invalid or excluded species. According to Benson (1972), *Poseidonamicus viminea* (Brady, 1880) is a *nomen dubium* (see also section below). Following Jellinek & Swanson (2003), *Poseidonamicus ansoni* Whatley, Moguilevsky, Ramos & Coxill, 1998 belongs to the genus *Harleya* Jellinek & Swanson, 2003.

Diagnosis. From Benson (1972). 'Distinguished from other reticulate, holamphidont thaerocytherid genera, principally by its suppressed but wide dorsal carina, the lack of an ocular ridge, the regular, vertically aligned fossae and muri (in reticulate species, or indicated in the pattern of fine structure within the carapace wall of nude forms) of the posteromedian portion of the reticulum, the semipunctate to reticulate aspect of its anterior region, and a characteristic, vertically oriented central mural loop that occurs between these two regions in the area of the muscle-scar pattern. Often there is a conspicuous vertical ridge that joins the posterior of the dorsal carina with the posterior of the ventrolateral carina. Muri and solae are usually featureless except for celate pores, both sieve and murate; few spines other than marginal spines are present. Smooth or nude forms with underlying reticular "ghosts"'.

Poseidonamicus hunti Brandão & Päplow, sp. nov.
(Pl. 3; Pl. 4, figs J–L; Pl. 5; Fig. 2; Tables 1–2)

2005 *Poseidonamicus* sp. Mazzini: 78, 80, fig. 46.A–N.

Derivation of name. In honour of Dr Gene Hunt, Smithsonian Institution, for his work on the genus *Poseidonamicus* and on the evolution of deep-sea ostracods.

Diagnosis. Valves sub-oval in lateral view. Anterior cardinal angle higher than posterior cardinal angle. Dorsal ridge inconspicuous. Ventrolateral ridge slightly developed but terminating in 1 robust spine. Fossae shallow; fossae in the anterior field small and rounded. Muri and mural loop weakly developed. Fossae in the posterior field not arranged in sub-vertical rows.

Material. 29 live specimens plus 2 subfossil valves.

Holotype. # 136-4-S, ANDEEP II, live adult male SNB 0886, 1 left valve, 1 right valve on a micropalaeontological slide ZMH K-42466a, plus its dissected soft parts on a glass slide ZMH K-42466b.

Paratypes.

- *Type locality* – # 136-4-E, ANDEEP II: 1 left valve, 1 right valve on a micropalaeontological slide ZMH K-42475c. 5 live adults, 4 live juveniles in alcohol, ZMH K-42475d.
- *Type locality* – # 136-4-S, ANDEEP II: 1 left valve, 1 right valve of the live adult female SNB 0885 on a micropalaeontological slide ZMH K-42467a, plus its dissected soft parts on a glass slide, ZMH K-42467b. 1 left valve, 1 right valve of the live adult male SNB 0884 on a micropalaeontological slide ZMH K-42475a, plus its dissected soft parts on a glass slide ZMH K-42475b. 11 live adults, 1 live juvenile in alcohol, ZMH K-42475e.
- # 42-2-S, ANDEEP I: 1 live adult ?female in alcohol, ZMH K-42495.
- # 81-8-U, ANDEEP III: 1 left valve, 1 right valve of the live

adult male SNB 0880 on a micropaleontological slide ZMH K-42464a, plus its dissected soft parts on a glass slide, ZMH K-42464b. 1 live adult male in alcohol, ZMH K-42464c.

- # 110-8-U, ANDEEP III: 1 left valve, 1 right valve of the live adult female SNB 0112 on a micropalaeontological slide, gold coated, ZMH K-42473a, plus its dissected soft parts on a glass slide, ZMH K-42473b.

Description. Valves elongate, sub-oval in lateral view. Posterior margin more narrowly rounded than anterior margin. Posterior margin with 5–8 spines; anterior margin with 11–14 spines. Dorsal margin oblique to ventral margin. Anterior cardinal angle higher than posterior cardinal angle. Ventral margin sub-rectilinear. Dorsal ridge inconspicuous. Ventrolateral ridge slightly developed but terminating in 1 robust spine. Fossae shallow; fossae in the anterior field small and rounded. Medial and posterior fossae largest. Muri and mural loop weakly developed. Anterior-most fossae sub-quadrate, large and shallow. Fossae in the posterior field sub-polygonal, not arranged in sub-vertical rows. Pitted secondary reticulation present in some specimens but not in others. Hinge holoamphidont. Maximum-height at anterior cardinal angle. Carapace sub-circular in dorsal view. Two frontal scars. Valves lack both ocular sinus and eye tubercle.

Antennula with 5 articulated segments, segments I and II fused and without setae but with some unarticulated fine, cuticular extensions, segments V and VI also fused. Segment III dorsally with 1 seta and ventrally with 1 very long seta. Segment IV with 1 plumose, dorso-distal seta. Segment V with 4 distal setae, 1 of which slightly shorter than the other 3 setae; plus 1 ventro-distal (possibly sensory) seta. Segment VI with 4 distal setae: 2 normal setae, 1 reduced seta and 1 claw. Segment VII with 1 distal claw, 1 seta and 1 modified structure (i.e. '1fsc' in chaetotaxy formula), this last modified structure is possibly an aesthetasc fused to a claw. The shortest branch of this supposedly fused seta is rounded and flexible.

Segments I and II of antenna without setae. Exopodite 3-segmented and modified as a spinneret seta. Segment III with 1 very long, ventro-distal claw. Segments IV and V fused. Segment IV ventrally with 2 long setae and 1 reduced seta, and dorsally with 2 distal setae. Segment V both dorsally and ventrally without setae, but distally with 1 claw and 1 reduced seta. Segment VI with 2 ventral claws and 1 distal claw.

The mandibula consists of a strongly sclerotized masticatory process (i.e. medial region of the coxa) with about 6 strong teeth (endites), 1 distal seta and a segmented palp. The mandibular palp consists of a basis (basipodite of some authors), a 1-segmented exopodite and a 2-segmented endopodite. Segment II (=basis) ventrally with 1 medium-sized, plumose seta, 1 short, 'carrot-like' seta and 1 long, distally plumose seta; ventro-distally with 2 medium-sized, simple setae. Exopodite with 2 distal setae, 1 of which is long, the other plumose. Segment III with 1 dorso-proximal seta, and 7 distal setae. Segment IV with 2 distal setae, 1 of which annulated.

Maxillula with a basis with three endites (or masticatory lobes, or masticatory processes), a 2-segmented endopodite (=palp), and a well-developed exopodite (or vibratory plate). The exopodite with about 14 'Strahlen' plus 1 dorso-proximal, plumose, aberrant 'Strahl'. Endite I with 4 distal setae and 1 thick, ventrolateral seta. Endite II with 5 distal setae. Endite III with 5–6 distal setae and 1 thick, ventrolateral seta. Segment I of palp with 1 thick, long, lateral seta and 4 dorso-distal setae. Segment II with 3 sub-equally long setae. Palp thicker then endites.

Segment I of the fifth limb dorso-proximally with 1 long, annulated seta and 1 shorter seta; ventrally with 'carrot-like' exopodite (Pl. 5, fig. G); distally with 2 annulated setae. Segment II dorso-distally with 1 short seta. Segment III without setae. Segment IV distally with 1 long claw.

Segment I of sixth limb dorsally with 1 long, annulated setae, ventrally with 1 seta-like exopodite, and distally with 2 short setae. Segment II dorso-distally with 1 short seta. Segment III without setae. Segment IV distally with 1 long claw.

Segment I of seventh limb dorsally with 1 long seta; distally with 2 short setae, 1 of them annulated; and ventrally with 1 seta-like, short exopodite. Segment II dorso-distally with 1 annulated seta. Segment III without setae. Segment IV distally with 1 long claw.

Furca reduced to 2 plumose setae.

Basal capsule of male copulatory limb sub-oval with a sharpened, distal end. Labyrinth heavily sclerotized. Copulatory process short and sinuous. Three lobes attached to the basal capsule: (1) smallest one dorsal, and elongated; (2) medium-sized one medially positioned and elongated; (3) largest one laterally positioned and sub-circular.

Chaetotaxy of the holotype. Antennula 1(0/0), 2(0/0), 3(0/0:1l), 4(.1./0), 5(0/0:3,1r,1l) +6(0/0:2,1r,1c), 7(0/0:1c,1s,1sfc). Antenna 1(0/0) +2(0/0), 3-segmented exopodite(0/0), [endopodite] 3(0/1), 4(0/2,1r:2) +5(0/0:1c,1r), 6(0/2c:1c). Mandibula 1(0/6t:1), 2(0/.1.1d.1p:1pl,3l) +[endopodite] +3(.1/0:3,4l) +4(0/0:2), exopodite (0/0:1,1p). Maxillula Palp 1(0/0: 4,1l), 2(0/0:3). Fifth limb 1(.1./0:2), 'carrot-like' exopodite, 2(.1./0), 3(0/0), 4(0/0:1c). Sixth limb 1(.1./0:2), seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c). Seventh limb 1(.1./0:2c), reduced, seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c).

Dimensions. Holotype: *adult male* – SNB 0886, LV L 1.14 mm, H 0.65 mm; RV L 1.14 mm, H 0.60 mm. Paratypes: *adult males* – SNB 0880, LV L 1.06 mm, H 0.54 mm; RV L 1.03 mm, H 0.544 mm; SNB 0884, LV L 1.15 mm, H 0.62 mm; RV L 1.12 mm, H 0.59 mm; *adult females* – SNB 0112, LV L 1.04 mm, H 0.59 mm; RV L 1.03 mm, H 0.58 mm; SNB 0885, LV L 1.19 mm, H 0.67 mm; RV L 1.18 mm, H 0.64 mm.

Distribution. (Fig. 2) Recent and subfossil. Southern Ocean, 1690–4978 m. Subfossils, Subantarctic zone of the Pacific Sector (South Tasman Rise, 1690–4067 m) (Mazzini, 2005). Recent, Antarctic zone of the Atlantic Sector (Weddell and Scotia seas, 3681–4782 m) (herein).

Remarks. The small and rounded, anterior fossae of *Poseidonamicus hunti* sp. nov. (Pl. 3, figs A–F) resemble the fossae of juveniles of other *Poseidonamicus* species. This may indicate neoteny in the lineage leading to *P. hunti*. *Poseidonamicus hisayoae* a late Cenozoic, Southern Ocean species has a similar morphology, which may suggest their common ancestry.

In lateral outline *P. hunti* is very similar to *P. hisayoae,* and the two species also share a weak dorsal and ventrolateral ridges. On the other hand, the medial fossae are arranged in conspicuous sub-vertical rows in *P. hisayoae*, while these fossae are arranged more randomly in *P. hunti*. The small and rounded, anterior fossae of *P. hunti* are similar to *P. anteropunctatus*, *P. dinglei* and *P. punctatus*, but the first species is more oval in outline, while the latter two species are sub-polygonal. *Poseidonamicus major*, *P. minor*, *P. pseudorobustus* and *P. riograndensis* show conspicuous dorsal and ventrolateral ridges, and a sub-polygonal outline, while in *P. hunti* the dorsal and ventrolateral ridges are weak and the outline is sub-oval. *Poseidonamicus miocenicus* and *P. pintoi* show strong muri and sub-rectangular fossae, while the muri of *P. hunti* are weak and the fossae are rounded. The muri and fossae are conspicuous in *P. hunti*, but selate in *P. nudus*. *Poseidonamicus ocularis*, *P. panopsus* and *P. whatleyi* have a sub-rectangular outline, *P. praenudus*, *P. robustus* and *P. rudis* are sub-polygonate, with a V-shaped posterior margin, while *P. hunti* is sub-oval.

Poseidonamicus tainae Brandão, sp. nov.
(Pl. 4, figs A–H; Pl. 6, figs A–D, G–I; Fig. 2; Tables 1–2)

Derivation of name. In honour of Taina Müller, Universität Hamburg, for her wise words.

Diagnosis. A large, moderately calcified, *Poseidonamicus* with sub-polygonal outline, except for the dorsal margin which is slightly concave. Dorsal ridge moderately robust. Ventral ridge rounded. Fossae shallow and large, muri low. Only primary ornamentation present on lateral surface. Posterior margin with up to 10 spines, anterior margin with 8 to 18 short, spines. Carapace sub-hexagonal in dorsal view.

Material. 15 live specimens plus 34 subfossil valves.

Holotype. # 129-2-S, ANDEEP I, 1 left valve, 1 right valve of the live adult male SNB 0882 on a micropalaeontological slide ZMH K-42456b, plus its dissected soft parts on a glass slide ZMH K-42456c.

Paratypes.

- *Type locality* – # 129-2-S, ANDEEP I: 1 right valve on a micropalaeontological slide, gold coated, ZMH K-42456a. 4 live adult females, 1 adult live male, in alcohol, ZMH K-42456d.
- # 41-3-E+S, ANDEEP I: 2 left valves coated with gold (+1 broken non-coated left valve), 7 right valves coated with gold (+1 broken non-coated right valve) on a micropalaeontological slide ZMH K-42470a. 1 closed, juvenile carapace (?with soft parts) in alcohol, ZMH K-42470b.
- # 80-6, ANDEEP III: 1 left valve, 2 right valves (all coated with gold) on a micropaleontological slide ZMH K-42471.
- # 80-9-S, ANDEEP III: 1 juvenile left valve (+ 1 broken adult left valve) on a micropalaeontological slide ZMH K-42477a.
- # 80-9, ANDEEP III: 1 live ?adult female in alcohol, ZMH K-42477b.
- # 81-9-E, ANDEEP III: 1 left valve on a micropaleontological slide ZMH K-42476.
- # 102-13-S, ANDEEP III: 1 left valve, 1 right valve of the live adult female SNB 0881 on a micropalaeontological slide ZMH K-42465a, plus its dissected soft parts of the adult female on a glass slide, ZMH K-42465b.
- # 131-3-E, ANDEEP I: 2 left valves, 4 right valves, ZMH K-42457a; 3 left valves, 5 right valves (all eight valves coated with gold and photographed in the electron microscope) on a micropalaeontological slide ZMH K-42457b. 1 left valve, 1 broken right valve of the specimen SNB 0302 on a micropalaeontological slide ZMH K-42457c, plus its dissected, fragmented soft parts on a glass slide, ZMH K-42457d.
- # 134-4-S, ANDEEP II: 1 left valve, 1 right valve of the live adult female SNB 0883 on a micropalaeontological slide ZMH K-42478a, plus its dissected soft parts on a glass slide, ZMH K-42478b. 1 left valve, 1 right valve on a micropalaeontological slide ZMH K-42478c. 1 live adult male, 1 live juvenile (with both valves broken) in alcohol, ZMH K-42478d.
- # 134-5, ANDEEP II: 1 left valve, 1 right valve on a micropalaeontological slide ZMH K-42472.
- # 137-4-E, ANDEEP II: 1 right (broken) valve on a micropalaeontological slide ZMH K-42462a. Live juvenile in alcohol, ZMH K-42462b.
- # 138-6-E, ANDEEP II: 1 left valve, 1 right valve of the live adult female SNB 0396 on a micropalaeontological slide ZMH K-42484a, plus its dissected soft parts on a glass slide, ZMH K-42484b.

Description. Valves sub-polygonal in lateral view. Dorsal margin slightly concave. Dorsal ridge conspicuous. Anterior margin with 8 to 18 short spines. Posterior margin with up to 10 spines, some of them long. Ventrolateral ridge well developed and terminating in 1 robust spine. Fossae just dorsal to ventrolateral ridge deep and rounded. Ventral margin convex. Fossae in the anterior field rounded, bounded with well-developed muri, and smaller than those in the posterior field. Anterior-most fossae sub-quadrate, large and deep. Fossae in the posterior field arranged regularly in sub-vertical rows, and sub-polygonate. Mural loop conspicuous. Hinge holoamphidont. Maximum height at anterior cardinal angle. Carapace sub-hexagonal in dorsal view. Valves show ocular sinus but lack eye tubercle.

Antennula with 5 articulated segments, segments I and II fused and without setae but with some unarticulated fine, cuticular extensions, segments V and VI also fused, suture between segments IV and V+VI faint. Segment III dorsally with 1 seta and ventrally with 1 very long seta. Segment IV with 1 plumose, dorso-distal seta. Segment V with 4 distal setae, 1 of which slightly shorter than the other 3 setae; plus 1 ventro-distal seta. Segment VI with 4 distal setae: 2 normal setae, 1 reduced seta and 1 claw. Segment VII with 1 distal claw, 1 seta and 1 modified structure (i.e. '1fsc' in chaetotaxy formula); this last modified structure is possibly an aesthetasc fused to a claw. The shortest branch of this last seta is rounded and flexible.

Segments I and II of antenna without setae. Exopodite 3-segmented and modified as a spinneret seta. Segment III dorsally with some unarticulated fine, cuticular extensions; ventro-distally with 1 very long, claw. Segments IV and V fused.

Segment IV medially with a few unarticulated fine, cuticular extensions; ventrally with 2 long setae and 1 modified seta; and dorsally with 2 distal setae. Segment V both dorsally and ventrally without setae, but distally with 1 claw and 1 small seta. Segment VI with 1 ventral claw, 1 ventral seta and 1 distal claw.

The mandibula consists of a strongly sclerotized masticatory process (i.e. medial region of the coxa) with 7 or 8 strong teeth (endites) and several very short, ventral setae, 1 short, distal seta, and a segmented palp. The mandibular palp consists of a basis (basipodite of some authors), a 1-segmented exopodite and a 2-segmented endopodite. Segment II (= basis) ventrally with 1 medium-sized, plumose seta and 1 short, 'carrot-like' seta; dorsally with 2 setae; distally with 2 long, plumose setae. Exopodite with 4 or 5 distal setae, 1 of which is long. Segment III with 1 dorso-proximal seta, 1 dorso-distal seta and 5 or 6 long ventro-distal setae and 2 short ventro-distal setae. Segment IV with 3 or 4 distal setae.

Maxillula with a basis with three endites (or masticatory lobes, or masticatory processes), a 2-segmented endopodite (= palp), and a well-developed exopodite (or vibratory plate). The exopodite with 14 'Strahlen' plus 1 dorso-proximal, plumose, aberrant 'Strahl'. Endite I with at least 4 distal setae and 1 thick, ventrolateral seta. Endite II with 4 distal setae. Endite III with 5 distal setae. Segment I of palp with 1 thick, long, lateral seta and 4 dorso-distal setae. Segment II with 3 sub-equally long setae. Palp thicker than endites.

Exopodite thicker in fifth limb, medium in sixth limb and thin in seventh limb. Segment I of the fifth limb dorso-proximally with 1 long, annulated seta and 1 shorter, annulated seta; ventrally with 'carrot-like' exopodite; distally with 2 annulated setae. Segment II dorso-distally with 1 short seta. Segment III without setae. Segment IV distally with 1 long claw.

Segment I of sixth limb dorsally with 2 long setae, ventrally with 1 plumose seta-like exopodite, and distally with 1 annulated seta. Segment II dorso-distally with 1 short seta. Segment III without setae. Segment IV distally with 1 long claw.

Segment I of seventh limb dorsally with 1 reduced seta, and 1 seta; distally with 1 annulated short seta, and ventrally with 1 seta-like, thin exopodite. Segment II dorso-distally with 1 seta. Segment III without setae. Segment IV distally with 1 long claw.

Furca reduced to 2 plumose setae, 1 of them half as long as the other.

Basal capsule of male copulatory limb sub-oval. Labyrinth heavily sclerotized. Copulatory process short and sinuous. Three lobes attached to the basal capsule: (1) smallest one dorsal and elongated; (2) medium-sized one medially positioned and elongated, sub-triangular; (3) largest one laterally positioned and sub-circular.

Chaetotaxy of the holotype. Antennula 1(0/0), 2(0/0), 3(1/1l:0), 4(.1/0), 5(0/0:3,1r,1l) +6(0/0:2,1r,1c), 7(0/0:1c,1s,1sfc). Antenna 1(0/0) +2(0/0), 3-segmented exopodite(0/0), [endopodite] 3(0/1), 4(0/3:2) +5(0/0:1c,1), 6(0/1c,1:1c). Mandibula 1(0/7-8t:1), 2(.1.1/.1d.1p:2lp,2) +[endopodite] +3(.1,1/0:2,5-6) + 4(0/0:3-4), exopodite (0/0:3-4,1l). Maxillula Palp 1(0/0: 4,1l), 2(0/0:3). Fifth limb 1(.2/0:2), 'carrot-like' exopodite, 2(.1./0), 3(0/0), 4(0/0:1c). Sixth limb 1(.1.1./0:1), seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c). Seventh limb 1(.1r.1./0:1), reduced, seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c).

Dimensions. Holotype: *adult male* – SNB 0882, LV L 1.02 mm, H 0.58 mm; RV L 1.01 mm, H 0.54 mm. Paratypes: *adult females* – SNB 0396, LV L 1.08 mm, H 0.61 mm; RV L 1.08 mm, H 0.63 mm; SNB 0881, LV L 1.20 mm, H 0.69 mm; RV L 1.18 mm, H 0.64 mm; SNB 0883, LV L 0.97 mm, H 0.56 mm; RV L 0.98 mm, H 0.55 mm. Adult with fragmented soft parts: SNB 0302, LV L 0.95 mm, H 0.56 mm; RV broken.

Distribution. (Fig. 2) Recent and subfossil. Atlantic Sector of the Southern Ocean. Weddell and Scotia seas, 2359–4978 m (herein).

Remarks. The limbs of *P. tainae* are not drawn here because they are very similar to the limbs of *P. hunti*, which are illustrated in Plate 5.

Poseidonamicus hisayoae is similar to *P. tainae* sp. nov., but (1) the dorsal and ventral margins are more sub-parallel in the latter species. As a consequence, (2) the anterior cardinal angle is conspicuously higher than the posterior one in *P. hisayoae*, but not in *P. tainae*. (3) The posterior margin is more narrowly rounded in *P. hisayoae*. (4) The dorsal ridge is weak in *P. hisayoae* but conspicuous in *P. tainae*.

Poseidonamicus anteropunctatus, *P. dinglei*, *P. major*, *P. praenudus*, *P. pseudorobustus*, *P. riograndensis*, *P. robustus* and *P. rudis* are sub-polygonal in outline with the dorsal margin oblique in relation to the ventral one. On the other hand, *P. tainae* is sub-oval with sub-parallel dorsal and ventral margins. Additionally, *P. major* is lozenge-shaped in dorsal view, while *P. tainae* is sub-hexagonal. *P. minor* and *P. miocenicus* display robust muri and deep fossae, while these features are weakly defined in *P. tainae*. The ornamentation of *P. nudus* is selated, while *P. yasuharai* has conspicuous muri and fossae. *Poseidonamicus ocularis*, *P. panopsus* and *P. whatleyi* display eye tubercles, robust muri and deep fossae, while *P. tainae* displays low muri and narrow fossae, and lacks eye tubercles. Similar to *P. tainae*, *P. pintoi* has a rounded, sub-oval outline, but the latter species is higher in relation to its length, and displays robust muri and deep fossae. In *P. tainae* the muri are low and fossae shallow. *P. punctatus* has a rounded dorsal margin, with inconspicuous anterior and posterior cardinal angles, while the dorsal margin of *P. tainae* is slightly concave and both anterior and posterior angles are easily distinguishable. Additionally, *P. punctatus* has a secondary reticulation, which is absent in *P. tainae*. *Poseidonamicus hunti* is sub-oval in outline, while *P. tainae* is sub-rectangular.

Poseidonamicus sp. cf. *P. tainae* Brandão, sp. nov.
(Pl. 6, figs E–F; Tables 1–2)

Material. 3 live specimens plus 1 subfossil valve.

- # 16-10-S, ANDEEP III: 1 left valve, 1 right valve of the live adult female SNB 0630 on a micropalaeontological slide ZMH K-42480a, plus its dissected soft parts on a glass slide, ZMH K-42480b. 1 right valve on a micropalaeontological slide ZMH K-42480c.
- # 16-11, ANDEEP III: 1 right valve of the live adult female SNB 0627 on a micropalaeontological slide ZMH K-42487a, plus its dissected soft parts on glass slide ZMH K-42487b.

- # 43-8-S, ANDEEP I: 1 left valve, 1 right valve of the live adult female SNB 0879 on a micropalaeontological slide ZMH K-42479a, plus its dissected soft parts on a glass slide, ZMH K-42479b.

Dimensions. *Adult female* – SNB 0627, LV L 1.06 mm, H 0.63 mm; RV L 1.02 mm, H 0.62 mm; LV L 1.02 mm, H 0.62 mm; SNB 0630, RV L 1.02 mm, H 0.59 mm; SNB 0879, LV L 1.04 mm, H 0.62 mm; RV L 1.04 mm, H 0.58 mm.

Remarks. Four specimens collected from stations 16 (Cape Basin) and 43 (Scotia Sea) show a similar outline and ornamentation pattern to *P. tainae*, but their muri are more strongly developed, the fossae are more rounded (Pl. 6, figs E–F) and their dorsal ridge is weaker than in *P. hunti* (Pl. 6, figs A–D, G).

Poseidonamicus viminea (Brady, 1880) *nomen dubium*
(Pl. 4, fig. I)

1880 *Cythere viminea* Brady: 94.
1972 *Poseidonamicus viminea*, Benson: pl. 2, fig. 15.

Material. Lectotype (by virtue of monotypy): 1 broken, subfossil, juvenile right valve on a micropalaeontological slide used by H. S. Puri in the 1960s and labelled '173, *Cythere viminea* Brady, H. S. Puri 7/67, T, Lectotype, 116, "Challenger", No. 146, Depth 1375, 81.5.33', NHM 81.5.33.

Remarks. Since the lectotype is a juvenile (Pl. 4, fig. I), Benson (1972) considered *Poseidonamicus viminea* a *nomen dubium*. We show here, for the first time, an SEM photograph of this lectotype.

An empty, original slide used by Brady (1880) labelled '*Cythere viminea* Brady, Type, 81.5.33, "Challenger", No. 146, Depth 1,375 faths., G. S. Brady, 173' is also included in the NHM collection.

Poseidonamicus yasuharai Brandão & Päplow, sp. nov.
(Pls 7–9; Fig. 3; Tables 1–2)

Derivation of name. In honour of Dr Moriaki Yasuhara, Smithsonian Institution, for his work on deep-sea ostracods and climate change.

Diagnosis. A large, moderately calcified, *Poseidonamicus* with sub-rectangular outline, sub-parallel and sub-rectilinear dorsal and ventral margins and ventrolateral ridge. Dorsal ridge very weak, projecting dorsally and joining the dorsal margin of the valve. Fossae shallow, muri low. Only primary ornamentation present on lateral surface. Posterior margin with up to 10 spines, anterior margin with 8 to 18 spines. Three frontal muscle scars.

Holotype. # 133-2-E, ANDEEP III, live adult male SNB 0211, 1 left valve and 1 right valve (coated with gold) on a micropalaeontological slide ZMH K-42469a, plus its dissected soft parts on a glass slide ZMH K-42469b.

Paratypes.

- *Type locality* – # 133-2-E, ANDEEP III: 13 left valve, 4 right valves (+ 4 broken right valves), 4 closed subfossil carapaces (+ 1 broken but measured), on a micropalaeontological slide (2 valves coated with gold), ZMH K-42453a. 1 left valve, 1 right valve of the live adult female SNB 0210 on a micropalaeontological slide ZMH K-42453b, plus its dissected soft parts on a glass slide, ZMH K-42453c.
- *Type locality* – # 133-2-U, ANDEEP III: 2 closed, subfossil carapaces (coated with gold), on a micropalaeontological slide ZMH K-42453d. 3 live adults (2 ?F, 1 M) specimens, ZMH K-42453e.
- # 80-9-E, ANDEEP III: 1 left valve, 1 right valve of the live adult male SNB 0626 on a micropalaeontological slide ZMH K-42474a, plus its dissected soft parts on a glass slide ZMH K-42474b. 1 left valve, 1 right valve (previously a closed, subfossil carapace) on a micropalaeontological slide ZMH K-42474c. 1 live juvenile in alcohol, ZMH K-42474d.
- # 89, EASIZ II: 1 left valve, 1 right valve (coated with gold) of the live juvenile specimen SNB 0315 on a micropalaeontological slide ZMH K-42481a, plus its dissected soft parts on a glass slide, ZMH K-42481b. Plus 17 live specimens in alcohol, ZMH K- 42481c.
- # 107, EASIZ II: 1 left valve, 1 right valve coated with gold on a micropalaeontological slide, ZMH K-42463.
- # 132-2-S, ANDEEP II: 96 left valve, 112 right valves (+ 2 broken right valves), 6 closed subfossil carapaces, on a micropalaeontological slide ZMH K-42459a. 1 left valve, 1 right valve of the live adult male SNB 0887 on a micropalaeontological slide ZMH K-42459c, plus its dissected soft parts on a glass slide ZMH K-42459b. 4 live adult males, 4 live adult females, 10 live adult ?females, 7 live adults, 3 live juveniles in alcohol, ZMH K-42459d.
- # 133-3-E, ANDEEP II: 5 uncoated plus 6 coated left valves (+ 1 broken left valve), 6 uncoated plus 9 coated right valves on a micropalaeontological slide, ZMH K-42458a. 4 live adults, 3 live juveniles in alcohol, ZMH K-42458b.
- # 145, EASIZ II: 3 live specimens in alcohol, ZMH K-42497.
- #272, EASIZ II: 1 left valve, 1 right valve (coated with gold) of the live adult female SNB 0006, on a micropalaeontological slide ZMH K-42460a, plus its dissected soft parts on a glass slide, ZMH K-42460b. Soft parts of 1 adult male with only right valve, and 1 live female, in alcohol, ZMH K-42460c.

Material. 75 live specimens plus 280 subfossil valves.

Description. Valves sub-rectangular in lateral view, males more elongate than females. Dorsal margin slightly sinuous; dorsal ridge very weak; anterior margin with 8 to 18 spines; posterior margin with up to 10 spines, a few of them robust and long. Ventrolateral ridge well developed, with 1 robust and long spine arising on its posterior end. Marginal rims (i.e. anterior-most and posterior-most areas of lateral surface) smooth and wide. Anterior muri more robust than posterior ones. Deep and rounded fossae just dorsal to ventrolateral ridge. Fossae in anterior field smaller, deeper and more rounded than those in posterior field. Posterior fossae polygonal and arranged regularly in sub-vertical rows. Anterior field separated from the posterior field by slight mural loop. Carapace arrow-shaped and rounded in dorsal and ventral views. Hinge holamphidont. Four vertically aligned and undivided adductor muscle scars, plus three frontal scars. Valves lack both ocular sinuses and eye tubercles.

Antennula with only 5 articulated segments; segments I and II fused; segments V and VI also fused. Segment I and II without setae but with some unarticulated barbulae. Segment III terminally with 1 long, ventrolateral seta, unarticulated barbulae also present on dorsal and ventral margins. Segment IV with one dorsal seta. Segment V with 4 distal setae and one lateral, possibly sensory seta (because of its rounded tip). Segment VI (fused to segment V) with 5 distal setae: 2 normal setae, 1 reduced seta and 2 claws. Segment VII with 2 distal claws and 1 modified structure (i.e. '1fsc' in chaetotaxy formula), which is possibly an aesthetasc fused to a claw. Supposedly sensory part of this modified seta is rounded and flexible.

Segments I and II of antenna fused and without seta. Segment III with 1 dorsal seta and 1 very long, ventral seta. Exopodite 3-segmented and modified as a spinneret seta. Segments IV and V fused. Segment IV dorso-distally with 2 setae; ventro-distally with 1 seta, 1 barbed claw, and 1 supposedly sensory, 'candle-shaped' seta with a flattened tip. Segment V without setae both dorsally and ventrally, but distally with 1 claw and 1 reduced seta. Segment VI with 2 ventral claws and 1 distal claw.

The mandibula consists of a strongly sclerotized masticatory process (= coxa) with 1 short, distal seta, around 5 strong teeth (endites) and a segmented palp. The mandibular palp consists of a basis (basipodite of some authors), a 1-segmented exopodite and a 2-segmented endopodite. Segment II (= basis) ventrally with 3 setae: 1 normal seta, 1 'carrot-like' seta, 1 plumose seta; ventro-distally with 1 long, plumose seta and 2 simple setae. Exopodite with 5 distal seta, one of these long and plumose. Segment III (= endopoite segment 1) with 5 distal setae, 1 dorsal seta, 3 simple lateral setae, and 1 lateral plumose seta. Segment IV with 4 distal setae, 1 of them annulated.

Maxillula basis with three endites (or masticatory lobes, or masticatory processes), a 2-segmented endopodite (= palp), a well-developed exopodite (or vibratory plate). Exopodite flat and large, with 15 distal 'Strahlen' and one proximal, plumose, dorsal, aberrant 'Strahl'. Endite I with 6 distal setae. Endite II with 5 distal setae and 1 thick, ventrolateral seta. Endite III with 5 to 6 distal setae. Segment I of palp with 1 thick, long lateral seta and 4 dorso-distal setae. Segment II with 2 long setae and 1 short seta. Palp as thick as endites.

Segment I of fifth limb dorsally with 2 annulated setae; distally with 2 annulated setae; ventrally with a 'carrot-like' exopodite (dashed and marked with a '*' in Plate 9, fig. F and detailed in Plate 9, fig. G). Segment II dorsally with 1 short, thick, distal seta. Segment III without seta. Segment IV with 1 long, distal claw.

Segment I of sixth limb dorsally with 2 setae, one of which is annulated; ventrally with seta-like exopodite; and distally with 1 short, thick, annulated seta. Segment II dorsally with 1 short, thick, distal seta. Segment III without seta. Segment VI distally with 1 long claw.

Segment I of seventh limb dorsally with 1 long, annulated seta, distally with 1 annulated seta; ventrally with seta-like, annulated exopodite. Segment II dorsally with 1 short, thick, distal seta. Segment III without setae. Segment IV distally with 1 long claw.

Basal capsule of male copulatory limb sub-oval with a sharpened, distal end. Labyrinth heavily sclerotized. Copulatory process short and straight. Three lobes attached to the basal capsule: (1) smallest (dorsal) is elongated; (2) medium-sized one is medially positioned and sub-triangular; (3) largest (laterally positioned) is sub-circular.

Furca reduced to 2 plumose setae, 1 of these long, the other short.

Chaetotaxy of the holotype. Antennula 1(0/0) +2(0/0), 3(0/0:1l), 4(.1./0), 5(0/0:4,1l) +6(0/0:2,1r,2c), 7(0/0:2c,1sfc). Antenna 1(0/0) +2(0/0), 3-segmented exopodite(0/0), [endopodite] 3(.1./1), 4(0/1,1c,1s:2) +5(0/0:1c,1r), 6(0/2c:1c). Mandibula 1(0/5t:1), 2(0/.1,1d,1p:1pl,2l) +[endopodite] 3(.1./0:5,3l,1pl) +4(0/0:4), exopodite (0/0:4,1p). Maxillula Palp 1(0/0: 4,1cl), 2(0/0:3c). Fifth limb 1(.2./0:2), 'carrot-like' exopodite, 2(.1/0), 3(0/0), 4(0/0:1c). Sixth limb 1(.1.1./0:1), seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c). Seventh limb 1(.1./0:1) +seta-like exopodite, 2(.1/0), 3(0/0), 4(0/0:1c).

Dimensions. Holotype: *adult male* – SNB 0211, LV L 1.06 mm, H 0.60 mm; RV L 1.07 mm, H 0.58 mm. Paratypes: *adult males* – SNB 0626, LV L 1.14 mm, H 0.61 mm; RV L 1.15 mm, H 0.64 mm; SNB 0887, LV L 1.12 mm, H 0.60 mm; RV L 1.10 mm, H 0.59 mm; *adult females* – SNB 0006, LV L 1.06 mm, H 0.59 mm; RV L 1.05 mm, H 0.60 mm; SNB 0210, LV L 1.00 mm, H 0.57 mm; RV L 1.00 mm, H 0.56 mm. *(A-1)* – SNB 0315, LV L 0.88 mm, H 0.49 mm; RV L 0.88 mm, H 0.47 mm. Adult subfossils: W 0.50–0.62 mm; (A-1) subfossil W 0.43 mm.

Distribution. (Fig. 3) Recent. Weddell Sea, Atlantic Sector of the Southern Ocean, bathyal and shallow abyssal depths (924–3136 m).

Remarks. A sub-rectangular outline with sub-parallel dorsal and ventral margins of *P. yasuharai* distinguish this species from *P. anteropunctatus*, *P. dinglei*, *P. hisayoae*, *P. hunti*, *P. major*, *P. minor*, *P. praenudus*, *P. pseudorobustus*, which are sub-polygonal, irregular in outline and have dorsal margin oblique in relation to ventral margin. *Poseidonamicus miocenicus*, *P. pintoi*, *P. punctatus* and *P. riograndensis* have rounded, sub-oval outlines, robust muri and deep fossae, while *P. yasuharai* is sub-rectangular with low muri and narrow fossae. Additionally, *P. punctatus* has secondary reticulation, which is absent in *P. yasuharai*. The ornamentation of *P. nudus* is selated, while *P. yasuharai* has conspicuous muri and fossae. *Poseidonamicus ocularis*, *P. panopsus* and *P. whatleyi* have eye tubercles, robust muri and deep fossae, while *P. yasuharai* is ornamented with low muri and narrow fossae, and has no eye tubercles. The lateral outline of *P. robustus*, *P. rudis* and *P. tainae* is sub-polygonal, the posterior margin is V-shaped and their ventrolateral ridges are curved and robust, while *P. yasuharai* is sub-rectangular in outline, its posterior margin is slightly rounded and its ventrolateral ridge is sub-rectilinear.

Poseidonamicus sp.

Material. 1 live specimen plus 4 subfossil valves.

- # 16-7, ANDEEP III: 1 juvenile right valve on a micropalaeontological slide ZMH K-42609.
- # 99-4-S, ANDEEP I: 1 juvenile right valve on a micropalaeontological slide ZMH K-42485.
- # 114-4-E, ANDEEP I: 1 broken left valve on a micropalaeontological slide, ZMH K-42461a; 1 live juvenile (A-?1) in alcohol, ZMH K-4261b.
- # 140-8-E, ANDEEP II: 1 left valve, 1 right valve of the live juvenile SNB 0878 on a micropalaeontological slide ZMH K-42486a, plus its dissected soft parts on a glass slide, ZMH K-42486b. 1 live juvenile in alcohol, ZMH K-42486c.
- # 141-10-E, ANDEEP II: 1 left valve (+ 1 broken left valve) on a micropaleontological slide ZMH K-42482.

Dimensions. Juveniles: SNB 0878 LV L 0.88 mm, H 0.50 mm. RV L 0.70 mm, H 0.38 mm.

Remarks. Only juveniles and adult broken valves were collected in the five ANDEEP stations 16-7, 99-4, 114-4, 140-8 and 141-10 and, since species-level identification of juveniles is not possible, these specimens are left in open nomenclature.

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