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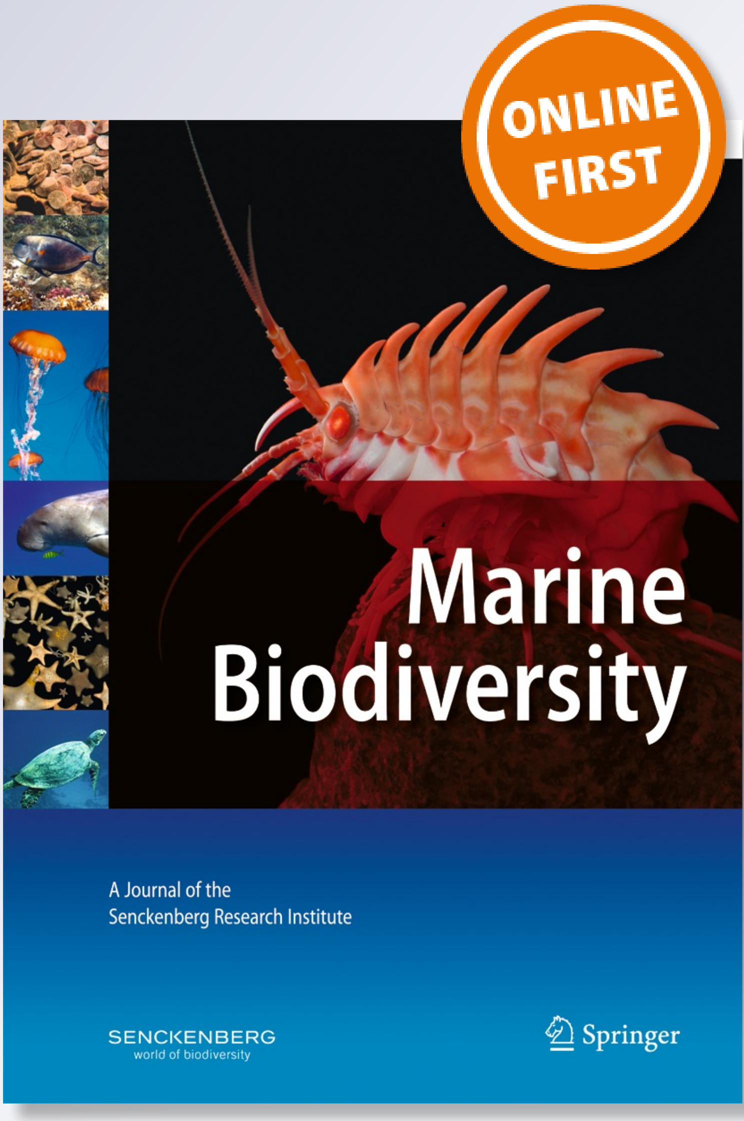

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ORIGINAL PAPER

An inverse latitudinal biodiversity pattern in asellote isopods (Crustacea, Peracarida) from the Southwest Atlantic between 35° and 56°S

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Abstract A distinct trend of decreasing biodiversity from the tropics to the poles is well-known for terrestrial organisms. This pattern, however, is less clear in marine systems. In the present study, an inverse latitudinal biodiversity pattern is reported for the asellote isopods from Argentina. Species richness is shown to be about six times higher in the Beagle Channel and southern Patagonia, i.e., south of 47°S, than north of this latitude. This high species richness of Asellota south of 47°S seems to be related with the predominance of gravelly bottoms in the southern Patagonian shelf and also with the tectonic history of the southern tip of South America. Inverse latitudinal gradients had been reported previously for echinoderms, bryozoans, sponges, amphipods and macroalgae from the southern Southwest Atlantic. Based on unpublished new records and information gathered from the literature, a database summarizing the distribution ranges of the Asellota along the coast of Argentina was compiled. A total of 108 species was recorded and the distribution records of this fauna were increased by 36.15 % (260 and 354 before and after our surveys, respectively).

Keywords Asellota · Isopoda · Species richness · Latitudinal biodiversity pattern · Argentina

B. L. Doti (✉) · D. Roccatagliata
Instituto de Biodiversidad y Biología Experimental y Aplicada (IBBEA), Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, C1428EGA Buenos Aires, Argentina
e-mail: bdoti@bg.fcen.uba.ar

J. López Gappa
Museo Argentino de Ciencias Naturales (MACN), Ángel Gallardo 470, C1405DJR Buenos Aires, Argentina

B. L. Doti · D. Roccatagliata · J. López Gappa
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina

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Introduction

The literature of the asellote from the southern tip of South America is scarce and the majority of the records of this fauna is restricted to three areas: the Malvinas Islands, the Straits of Magellan and the Beagle Channel (*see* Nordenstam 1933; Winkler 1994; Brandt et al. 1999; Doti et al. 2005). No study dealing with the biodiversity pattern of the asellote isopods along the coast of Argentina has been published until now.

On the contrary, the biodiversity patterns of other benthic marine groups from Argentina such as echinoderms, decapods, bryozoans, poriferans, amphipods and macroalgae have been analyzed (*see* Bernasconi 1964; Boschi 2000a, b; López Gappa 2000; López Gappa and Landoni 2005; López Gappa et al. 2006; Liuzzi et al. 2011). In all the above mentioned groups, with the noticeable exception of decapods (Boschi 2000a, b), the biodiversity declines from higher to lower latitudes, a pattern that contrasts with the poleward biodiversity decrease mentioned for many terrestrial and marine organisms (*see* Brown and Lomolino 1998; Gaston 2000; Roy et al. 1998, 2000).

Moreover, in a global-scale study of the deep sea benthos, Rex et al. (1993) reported a clear latitudinal diversity gradient in the North Atlantic but strong interregional variation in the South Atlantic. In particular, these authors have located a center of exceptionally high diversity of isopods in the Argentine Basin.

The aim of this study was to test whether the asellote isopods show latitudinal biodiversity patterns along the coast of Argentina. With this purpose, a database summarizing the distribution ranges of the Asellota was compiled, based on new distribution records and on an exhaustive search in the literature.

Material and methods

The material studied was collected along the coast of Argentina, between 2001 and 2007. The localities sampled were:

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Quequén, San Antonio Oeste, Puerto Madryn, Comodoro Rivadavia, Rada Tilly, Puerto Deseado, De los Estados Island and the Beagle Channel (Fig. 1). A total of 54 samples was obtained between 2 and 80 m depth (Table 1). Three sampling devices of similar type were used, depending on the size of the ship and the facilities on board: a small dredge (SD), a large dredge (LD), and a Rauschert sledge (RS), of 30×6 cm, 50×20 cm and 55×15 cm mouth opening, respectively. The SD and RS were equipped with a nylon net of 1-mm mesh size, while the LD had a 2-mm steel-wire mesh. The rectangular mouths of these three sampling gears have a limited penetration into the sediment; therefore, all of them were particularly useful for sampling the invertebrate epifaunal community. ANOVA analyses with blocks (Sokal and Rohlf 1981) were performed to test the null hypothesis of no difference in sampling efficiency among the three gears used. As there were large differences in species richness between localities north and south of 47°S (Fig. 3) and one of the devices (LD) was not used in the northern localities (Table 1), two different ANOVAs were carried out. The model regarded the sampling devices as treatments, the localities as blocks and the samples obtained at each locality as replications. San Antonio Oeste and De los Estados Island were not included in these analyses due to their small number of replications (Table 1). These calculations were performed using the statistical programming language R. The species accumulation curves were calculated using the software PRIMER (Clarke and Warwick 2001).

All the material obtained was fixed in 10 % buffered formalin solution and then transferred to 70 % ethanol. In the laboratory, the asellotes were picked up from the bulk sample under a stereoscopic microscope Leica MZ8, and identified to species level.

A database was compiled based on the species collected during the surveys carried out by us between 2001 and 2007 and those reported from the literature. In Appendix 1, the literature used for preparing this database is provided. The area considered is restricted between 35° to 56°S and 53° to 72°W. It comprises the continental shelf and the slope off the Argentine coast, the Straits of Magellan and several Chilean islands located south of the Beagle Channel. The whole area was divided into a 1° square grid. The squares containing records of asellote species were numbered from west to east and from north to south (Fig. 4). Only samples from our surveys were taken into account to assess the sampling effort along the coast of Argentina. With the aim of calculating the increase of the distribution records of asellote species in the study area before and after the present study, the sums of records in all 1° squares were compared.

The comparison of the Magellan asellote species from the Pacific and Atlantic coasts is based on the following literature: records from the Pacific were gathered from the revisions of Lancellotti and Vásquez (2000), Espinosa-Pérez and Hendrickx (2006) and González et al. (2008), as well as from

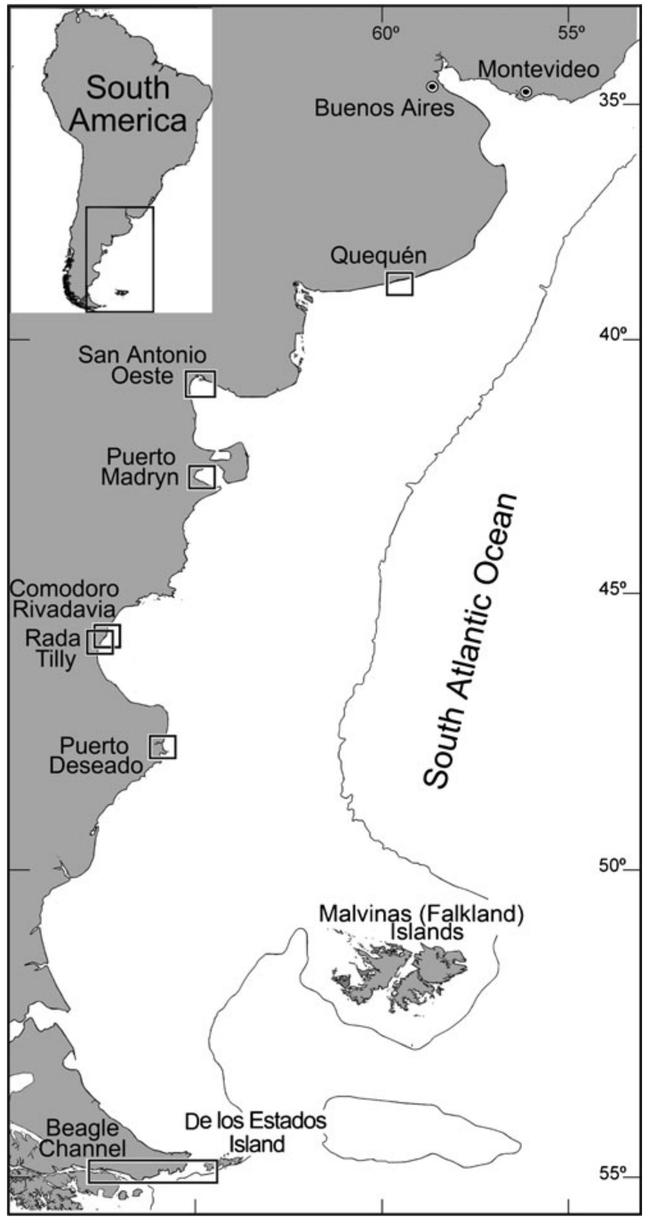

Fig. 1 Localities sampled between 35° and 56°S in the SW Atlantic. The 200-m isobath is shown

some of the publications listed in Appendix 1. Regarding the Atlantic records, all the species considered are marked in Appendix 1. The species provisionally identified with a letter most probably are new to science, and thus were taken into account for this comparison. On the contrary, those species identified with the acronyms “cf.” or “sp.” were omitted from this analysis because their current taxonomical status is uncertain.

In the study area two biogeographic provinces are recognized: the Argentine Biogeographic Province (ABP) and the Magellan Biogeographic Province (MBP). The ABP comprises the coastal waters of Brazil, Uruguay and Argentina, from Cabo Frio (23°S) to Valdés Peninsula (43°S). The MBP

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Table 1 Relationship between the biodiversity of Asellota and the sampling effort along the coastal localities studied. *Numbers within square brackets* correspond to the 1° squares shown in Fig. 4

Locality	No. of samples	Percent samples with Asellota	No. species	Ratio of species/samples	Depth (m)	Gear used
Quequén [5]	7	71.4	1	0.14	38–60	RS
San Antonio Oeste [9]	2	50.0	2	1.00	10–20	RS
Puerto Madryn [11]	9	44.4	1	0.11	5–12	SD
Comodoro Rivadavia [15]	6	66.6	5	0.83	8–14	3 RS, 3 SD
Rada Tilly [15]	6	33.3	3	0.50	10–16	1 RS, 5 SD
Puerto Deseado [18, 21]	16	100.0	32	2.00	2–65	5 RS, 10 SD, 1 LD
Beagle Channel [47, 48, 56]	7	100.0	33	4.71	15–80	LD
De los Estados Island [52]	1	100.0	18	18.00	40–60	LD

RS Rauschert sledge, *SD* small dredge, *LD* large dredge

extends along the Patagonian shelf on both the Pacific and the Atlantic coasts (including the Malvinas Islands); this province deflects from the continent at 43°–44°S going north, reaching latitude 35°S on the Atlantic coast (Fig. 4).

Results

A total of 20,112 isopods were obtained, the Asellota being the dominant suborder with 15,008 specimens (74.6 %). Within this suborder, Paramunnidae is the most speciose (22 species) and abundant (5,762 specimens) family; followed by Janiridae in species richness (seven species) and Munnidae in abundance (4,212 specimens) (Fig. 2). Among the Paramunnidae, at least five of the 22 species identified are new to science, which represents an increase of 22.7 % in the current knowledge of this family from the Argentine Sea.

Fewer samples were collected south of 47°S than north of this latitude (24 vs 30 samples); however, the number of species was remarkably higher south than north of 47°S (38 vs 8 species). Consequently, the ratio of species/samples is about six-times higher south than north of 47°S (1.58 vs 0.27 species/samples) (*see* Table 1, Appendix 1). Besides, asellotes were found only in 16 of the 30 (53.3 %) samples collected north of 47°S. In contrast, south of 47°S they were recovered from all the 24 samples collected (Table 1). It is worth noting that in the samples lacking asellotes, other peracarids (often thousands of them) were collected, which supports the fact that the three sampling gears worked properly and that asellotes were indeed absent in these samples.

The null hypothesis of no difference in species richness among sampling gears could not be rejected (north of 47°S: localities, $F=2.34$, $p=0.10$, gears: $F=0.12$, $p=0.73$; south of 47°S: localities, $F=4.98$, $p=0.04$, gears: $F=0.72$, $p=0.41$). Therefore, we can assume that the three gears used in this study sampled the benthos with similar efficiency.

Both the number of asellote species per 1° square and the number of asellote species per sample were highest at the southernmost localities (Beagle Channel/De los Estados Island and Puerto Deseado). Figure 3 shows that species accumulation curves calculated for localities south of 47° S (Beagle Channel, Puerto Deseado) are much higher and steeper than those found for localities north of this latitude. San Antonio

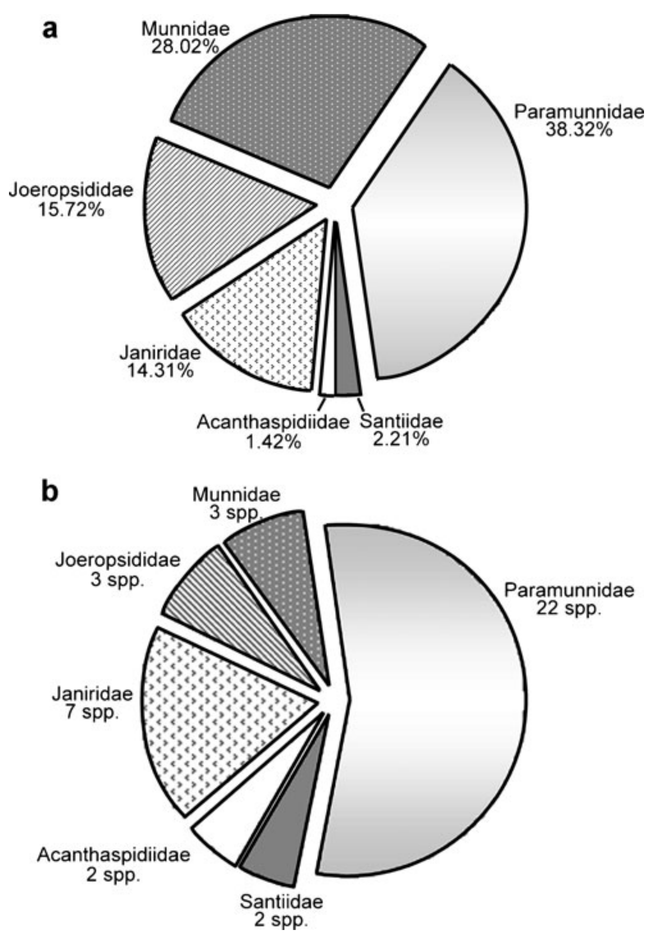

Fig. 2 **a** Relative abundance of the Asellota families collected in the localities sampled ($n=15{,}008$ specimens), **b** Number of Asellota species per family

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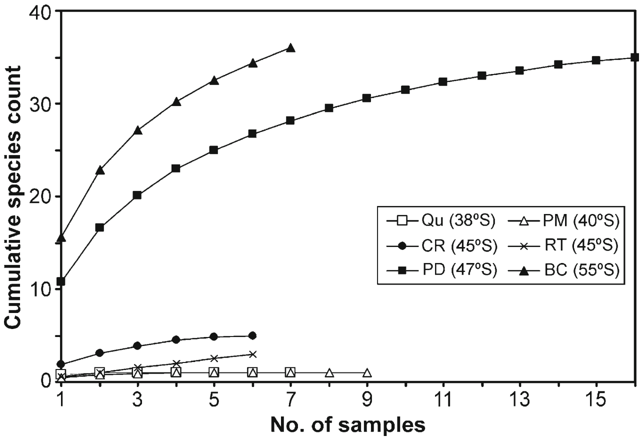

Fig. 3 Species accumulation curves based on 999 randomizations. San Antonio Oeste and De los Estados Island were not included due to low number of samples. *Qu* Quequén, *PM* Puerto Madryn, *CR* Comodoro Rivadavia, *RT* Rada Tilly, *PD* Puerto Deseado, *BC* Beagle Channel

Oeste and De los Estados Island were not included in Fig. 3 due to their low number of samples. It is worth noting, however, that their species richness levels agree with those seen for localities north and south of 47° S, respectively (San Antonio Oeste: 0–2 species, De los Estados Island: 18 species).

Not only the asellote species richness was highest south to Puerto Deseado but also the composition of the benthic assemblage was more complex south to this locality. Samples south to Puerto Deseado were abundant in sponges, hydrozoans, bryozoans and macroalgae, gravel being the main fraction of the sediment. Conversely, in the remaining localities (Quequén, San Antonio Oeste, Puerto Madryn, Comodoro Rivadavia and Rada Tilly) there were fewer groups of invertebrates and almost no macroalgae, while the sediment was composed mainly of sand and mud.

Four of the seven samples taken in Quequén contained specimens of *Munnogonium* sp. B, the only asellote species recorded from this locality. Remarkably, of the 92 asellotes collected, 80 were found in a single sample (Sta. 4), all of them attached to the sea star *Astropecten brasiliensis* Müller and Troschel, 1842. The remaining 12 asellotes were found in samples without sea stars. This biased distribution strongly suggests an association between these two species.

Our results, together with the information found in 51 taxonomic and ecological papers published between 1884 and 2012, comprise a total of 108 species distributed in 11 families (Appendix 1) for the whole study area. The distribution records of the asellotes in the study area (divided into 1°× 1° squares) are summarized in Fig. 5. Asellotes were recorded in 60 squares; of these, 13 squares showed a high number (between 8 and 42) of species. These 13 squares are all located south of 47°S, i.e., Puerto Deseado, Magellan Straits, Beagle Channel, De los Estados Island and Malvinas Islands. The present study increases the amount of distributional records of asellote isopods in the study area by 36.15 % (260 and 354 before and after this survey, respectively; Fig. 5, Appendix 1).

After merging our data with those of the literature, the Paramunnidae is confirmed as the family with the highest species richness (*see* Appendix 1).

Regarding the shallow water asellotes (<200 m) from the Magellan Biogeographic Province (MBP), 47 species were recorded from the Pacific coast and 45 species from the Atlantic coast. The number of shared species between these two coasts is 25 (37 %).

Discussion

The main conclusion of this study is the remarkable impoverishment of the Asellota north of 47°S. When samples from coastal localities of Tierra del Fuego and Santa Cruz Provinces (Beagle Channel, De los Estados Island and Puerto Deseado) are compared with northern localities, a dramatic biodiversity decrease is observed. Of the 33 species found in the Beagle Channel, 27 were also recorded from Puerto Deseado, but only four were found as far north as Comodoro Rivadavia/ Rada Tilly. Since the sampling effort in these three localities was quite similar, this remarkable reduction in the number of Magellanic species occurring between Puerto Deseado and Comodoro Rivadavia/Rada Tilly seems to be a real trend, and not an artifact attributable to sampling bias.

This faunistic pattern seems to be related with the sediment composition in the southern Patagonian shelf and also with the geological history of the southern tip of South America.

Among the different sedimentary fractions found along the continental shelf of Argentina, gravel predominates south of 47°S, whereas sand and mud are the most abundant sediments north of this latitude (Parker et al. 1997). Changes in sediment composition are also reflected in the taxonomic origin of bioclasts found in the continental shelf. While biogenic carbonates are mainly originated by fragmentation of calcareous skeletons of colonial filter-feeders in the southernmost latitudes of the continental shelf, molluscs and, to a lesser extent, brachiopods and polychaete tubes dominate among the bioclasts found north of 47°S (Bastida et al. 1981). The high species richness of Asellota found south of 47°S seems to depend on the presence of gravel and hard substrata populated by filter-feeders and macroalgae, and on the absence or scarcity of mud. The erect and sessile epifauna, as well as macroalgae, may play the role of ecosystem engineers by increasing the heterogeneity of the environment and thus increase the local biodiversity (Coleman and Williams 2007). Among the northern localities, not only the species richness was low but also the abundance. Remarkably, the highest number of asellotes was found in Quequén (Sta. 4), and most of these specimens were attached on the surface of sea stars. This fact suggests

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that associations with other macroinvertebrates may benefit the isopods by providing food and shelter (*see* Harty 1979; Pires 1995; Doti et al. 2008).

The Argentine and Magellan Biogeographic Provinces (ABP and MBP, respectively) have been recognized by several authors after studying the patterns of distribution of different groups of invertebrates off the coast of Argentina (Parodiz 1942; Balech 1954; Bastida et al. 1992; Boschi 2000a, b; López Gappa et al. 2006). Asellote isopods were so poorly represented in the ABP that a difference in faunistic composition and details of the transition between the Argentine and Magellan assemblages could not be assessed by multivariate analysis. Our data show that localities belonging to the ABP (1° squares 3, 5, 6, 9, 11; Figs. 4 and 5) have just one or two species per 1° square, whereas 1° squares with more than ten asellote species were found only south of 47°S.

In the Northern Hemisphere a consistent trend in decreasing diversity towards the pole has been reported for marine teleosts, molluscs and foraminiferans (*see* Roy et al. 1998, 2000, and references therein). Conversely, along the coast of Argentina the inverse latitudinal pattern has been observed in asellote isopods (this paper), as well as in echinoderms (Bernasconi 1964), bryozoans (López Gappa 2000), poriferans (López Gappa and Landoni 2005), amphipods (López Gappa et al. 2006), and benthic macroalgae (Liuzzi et al. 2011). In this regard, Bastida et al. (1992) reported that the number of species of molluscs, echinoderms and bryozoans collected during a benthic survey encompassing the whole Argentine continental shelf was more than three-times higher in the MBP than in the ABP. The exception to this trend is shown by the decapods, whose biodiversity decreases from low to high latitudes along the coast of Argentina (Boschi 2000a, b), a fact that might be

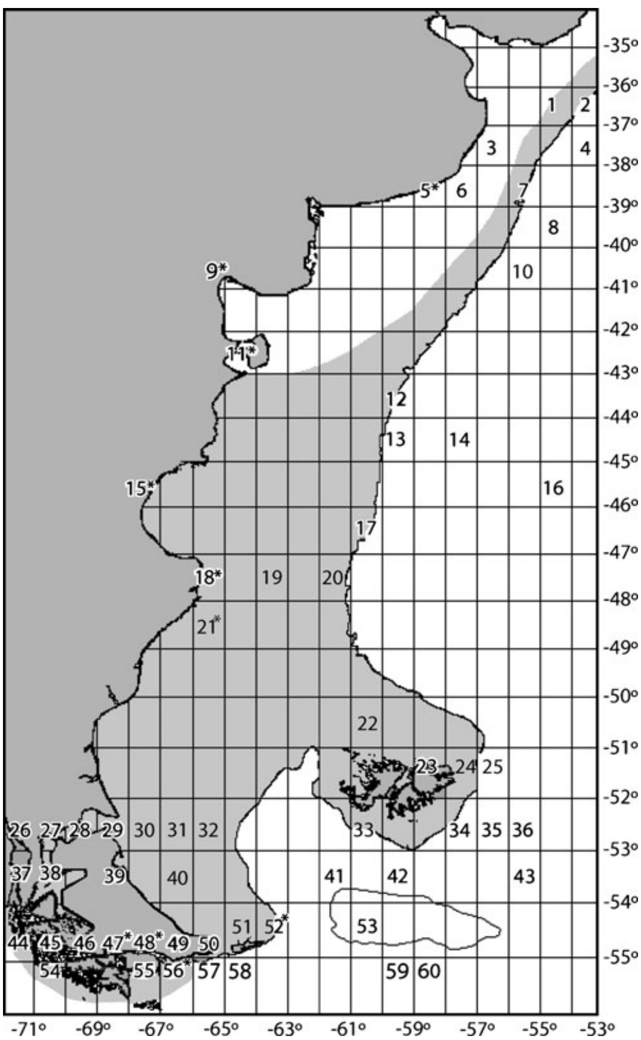

Fig. 4 One-degree squares containing records of Asellota species according to our samplings and the literature records, numbered from the continent to 53°W, and from 35°S to 56°S. An *asterisk* points out the squares sampled by us. The 200-m isobath is shown. The *shadow area* represents the Magellan Biogeographic Province (MBP) in the study area

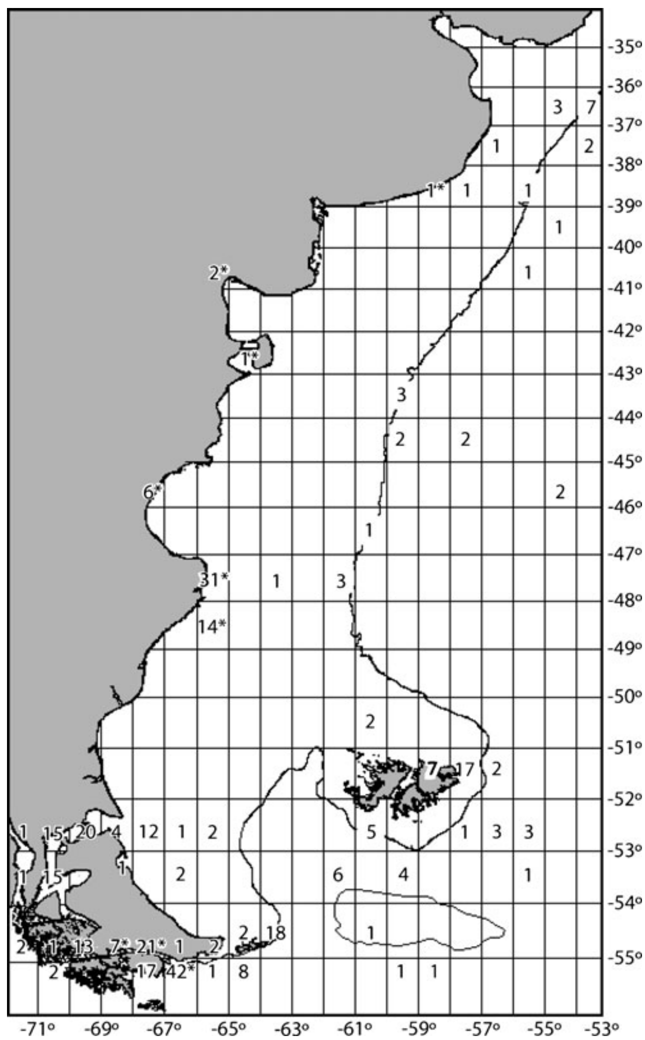

Fig. 5 Number of Asellota species in each 1° square of the study area. The species recorded from each square are listed in Appendix 1. An *asterisk* points out the squares sampled by us. The 200-m isobath is shown

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explained by the effect of temperature on the length of planktonic life and on brooding costs (Astorga et al. 2003; Fernández et al. 2009).

For the Southeast Pacific, Lancellotti and Vásquez (2000), Valdovinos et al. (2003), Espinosa-Pérez and Hendrickx (2006), and González et al. (2008) also reported an increase in biodiversity towards high latitudes. Moreover, Espinosa-Pérez and Hendrickx (2006) stated that within Isopoda, the Asellota is clearly the dominating suborder (48 % of the species recorded) in the Pacific coast of the MBP.

In an analysis of latitudinal changes in biodiversity along the Southeast Pacific coast, Fernández et al. (2000) indicated that for most marine invertebrates and macroalgae, hotspots in species diversity are present in southern Chile. In addition, Valdovinos et al. (2003) hypothesized that the increased shelf area, together with geographic isolation during glaciations, enabled high rates of species diversification in the Magellan fjords (south of 42°S).

The high number of asellote species shared between the Atlantic and Pacific sides of the Magellan Region (37 %) can be explained by the recent geological history of the southern tip of South America, i.e., the opening of the Drake Passage to deep sea circulation during the Eocene-Oligocene boundary (Lawver and Gahagan 2003). Therefore, it is likely that the Magellan benthic biota currently found off Santa Cruz and Tierra del Fuego and around the Malvinas Islands originated in the Southeast Pacific and then entered the Southwest Atlantic during the formation of the Malvinas/Falkland current. This hypothesis is supported by (1) a biogeographical analysis of the Miocene molluscan faunas of Argentina and Uruguay (Martínez and del Río 2002) that concluded that the dominant Caribbean elements became extinct or moved northwards by the end of the Miocene times, i.e., after the development of the cold Malvinas/Falkland current, and (2) studies on recent fauna (decapods: Vinuesa 1977; bryozoans: López Gappa 2000, etc.) that suggested that the Magellan biota inhabiting most of the shelf off Argentina originated in the Southeast Pacific.

Although our knowledge on the asellote isopods from Argentina is still fragmentary, we strongly believe that the biodiversity pattern shown in this paper would not change substantially with the discovery of new species and the addition of new records of distribution from this area.

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Appendix 1

Table 2 List of asellote species recorded from the study area. Square numbers correspond to those shown in Fig. 4

Species	Square numbers[b]	References
Acanthaspidiidae		
Acanthaspidia longiramosa (Vasina and Kussakin 1982)	34, 35, 36	Vasina and Kussakin (1982)
Acanthaspidia mucronata (Menzies and Schultz 1968)	25, 42	Menzies and Schultz (1968)
Ianthopsis bovalli (Studer 1884)[a]	19, 27, 28, 30, 33, 38 46, 55, 56	Studer (1884), Nordenstam (1933), Lorenti and Mariani (1997), Brandt et al. (1999)
Ianthopsis laevis Menzies 1962[a]	*18*, 20, 27, 28, 38, *48*, *52*, 56	Winkler (1992a), Cariceo et al. (2002), Ríos et al. (2003), Doti et al. (2005), Sánchez et al. (2011), herein recorded
Ianthopsis sp.	*18*	Herein recorded
Desmosomatidae		
Eugerdella falklandica (Nordenstam 1933)[a]	23	Nordenstam (1933)
Eugerdella cf. *falklandica* (Nordenstam 1933)	44	Brandt et al. (1999)
Haploniscidae		
Antennuloniscus ornatus Menzies 1962	58	Menzies (1962b)
Ischnomesidae		
Gracilimesus hanseni (Kavanagh, Wilson and Power 2006)	2	Kavanagh et al. (2006)

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Table 2 (continued)

Species	Square numbers[b]	References
Janiridae		
Austrofilius furcatus Hodgson 1910[a]	*18*, 24, 46, *47*, 48, *52*, 55, 56	Nordenstam (1933), Winkler and Brandt (1993), Brandt et al. (1999), Doti et al. (2005), herein recorded
Caecianiropsis cf. *ectiformis* (Vanhöffen 1914)	*21*, 48, 56	Doti et al. (2005), herein recorded
Iais pubescens (Dana 1852)[a]	*15*, 18, 23, 24, 25, 27, 38, 51, 54, *56*	Stebbing (1900), Giambiagi (1925), Nordenstam (1933), Menzies (1962a), Ringuelet et al. (1962), Gómez Simes (1979), Callebaut Cardu and Borzone (1979), herein recorded
Ianiropsis chilensis Menzies 1962	38	Menzies (1962a)
Ianiropsis cf. *chilensis* Menzies 1962	*18*, *52*, *56*	Herein recorded
Iathrippa longicauda (Chilton 1884)[a]	12, 23, 24, 26, 33, 41, 56	Nordenstam (1933), Kussakin (1967)
Iathrippa cf. *longicauda* (Chilton 1884)	46, 55, 56	Brandt et al. (1999)
Iathrippa menziesi Sivertsen and Holthuis 1980[a]	*18*, 20, *21*, 27, 28, 30, 38, 48, *52*, 55, 56	Winkler and Brandt (1993), Lorenti and Mariani (1997), Brandt et al. (1999), Cariceo et al. (2002), Ríos et al. (2003), Doti et al. (2005), Sánchez et al. (2011), herein recorded
Iathrippa multidens Menzies 1962	38	Menzies (1962a)
Iathrippa sarsi (Pfeffer 1887)[a]	14, 24	Stebbing (1914), Nordenstam (1933), Kussakin (1967)
Iathrippa trilobatus (Richardson 1910)[a]	21, 38	Richardson (1910), Giambiagi (1925), López Gappa et al. (1982)
Iathrippa varians (Winkler and Brandt 1993)[a]	*18*, *21*, 27, 28, 48, 56	Winkler and Brandt (1993), Doti et al. (2005), herein recorded
Neojaera antarctica (Pfeffer 1887)[a]	14, *18*, 23, 24, 27, 28, *47*, 48, *52*, 55, 56	Nordenstam (1933), Winkler and Brandt (1993), Brandt et al. (1999), Doti et al. (2005), herein recorded
Joeropsididae		
Joeropsis curvicornis (Nicolet 1849)[a]	13, *15*, 18, 20, *21*, 22 24, 27, 30, 31, 32, 33, 39, 40, 41, 42, 48, 49, 50, *52*, 53, 54, 55, 56, 57	Richardson (1909), Nordenstam (1933), Menzies (1962a), Menzies and Schultz (1968), López Gappa et al. (1982), Mariani et al. (1996), Lorenti and Mariani (1997), Brandt et al. (1999), Doti et al. (2005), López Gappa and Sueiro (2007), Sánchez et al. (2011), herein recorded
Joeropsis dubia Menzies 1951	6	Lini et al. (1995)
Joeropsis intermedius Nordenstam 1933[a]	3, *18*, 22, 24, 27, 30, 32, 33, 40, 41, *47*, 48, 50, 51, *52*, 55, 56	Nordenstam (1933), Menzies (1962a), Menzies and Schultz (1968), Mariani et al. (1996), Lorenti and Mariani (1997), Brandt et al. (1999), Doti et al. (2005), Thatje and Brown (2009), herein recorded
Joeropsis sp.	*18*, *21*, 30, *48*, *56*	Centurión and López Gappa (2012), herein recorded
Munnidae		
Astrurus ornatus Vanhöffen 1914	35	Kussakin and Vasina (1984)
Munna argentinae Menzies 1962	58	Menzies (1962b)
Munna chilensis Menzies 1962	28, 38, 46, 47, 55, 56	Menzies (1962a), Brandt et al. (1999), Thatje and Brown (2009)
Munna gallardoi Winkler 1992[a]	*18*, 27, 28, 30, *48*, 55, 56	Winkler (1992b), Lorenti and Mariani (1997), Brandt et al. (1999), Doti et al. (2005), Thatje and Brown (2009), herein recorded
Munna longipoda Teodorczyk and Wägele 1994[a]	23, 56	Teodorczyk and Wägele (1994)
Munna lundae Menzies 1962	38	Menzies (1962a)
Munna neglecta Monod 1931[a]	24, 33	Stebbing (1919), Nordenstam (1933), Monod (1931)
Munna pallida Beddard 1886[a]	24	Nordenstam (1933)
Munna cf. *pallida* Beddard 1886	*48*	Herein recorded
Munna spicata Teodorczyk and Wägele 1994	55, 56	Brandt et al. (1999)
Munna sp.	*9*, *11*, *15*, 18, 29, 30, *47*, 48, *52*, 55, 56	Centurión and López Gappa (2012), Callebaut Cardu and Borzone (1979), Brandt et al. (1999), Doti et al. (2005), herein recorded

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Table 2 (continued)

Species	Square numbers[b]	References
Uromunna nana (Nordenstam 1933)[a]	23, 28, 38, 55, 56	Nordenstam (1933), Menzies (1962a), Winkler (1992b), Brandt et al. (1999)
Munnopsidae		
Betamorpha fusiformis (Barnard 1929)	2	Thistle and Hessler (1977)
Betamorpha megalocephalis Thistle and Hessler 1977	2	Thistle and Hessler (1977)
Coperonus comptus Wilson 1989	2	Wilson (1989)
Eurycope vicarius Vanhöffen 1914	58	Menzies (1962b)
Eurycope sp.	46	Brandt et al. (1999)
Disconectes antarcticus (Vanhöffen 1914)	44, 45	Brandt et al. (1999)
Ilyarachna antarctica (Vanhöffen 1914)[a]	46, 58	Menzies (1962b), Brandt et al. (1999)
Ilyarachna argentina Thistle 1980	2	Thistle (1980)
Ilyarachna scotia Menzies 1962	58	Menzies (1962b)
Munneurycope antarctica Schultz 1977	43	Schultz (1978)
Sursumura angulata (Malyutina and Brandt 2004)	36	Malyutina and Brandt (2004)
Sursumura praegrandis (George and Menzies 1968)	35	George and Menzies (1968a, b), Malyutina (2003)
Syneurycope heezeni Menzies 1962	58	Menzies (1962b).
Vanhoeffenura birsteini (Menzies 1962)	58	Menzies (1962b), George and Menzies (1968a, b)
Vanhoeffenura scotia (George and Menzies 1968)	59, 60	George and Menzies (1968a, b)
Paramunnidae		
Abyssianira argentenensis Menzies 1962[a]	1, *52*, 56	Doti and Roccatagliata (2006), herein recorded
Abyssianira acutilobi Doti and Roccatagliata 2006	2	Doti and Roccatagliata (2006)
Abyssianira sp. A[a]	*18*, *52*, *56*	Herein recorded
Abyssianira sp. B[a]	*15*, *18*, *48*, *56*	Herein recorded
Advenogonium fuegiae (Doti and Roccatagliata 2005)[a]	*18*, *21*, 30, *48*, 56	Doti and Roccatagliata (2005), Centurión and López Gappa (2012), herein recorded
Advenogonium sp. A[a]	*56*	Herein recorded
Allorostrata ovalis Winkler 1994[a]	*18*, *21*, 27, 28, 46, *52*, 55, 56	Winkler (1994), Brandt et al. (1999), Doti et al. (2005), herein recorded
Allorostrata scutifrons Just and Wilson 2004	28	Just and Wilson (2004)
Antennulosignum elegans Nordenstam 1933[a]	*18*, *21*, 24, 48, *52*, *56*	Nordenstam (1933), Doti et al. (2005), herein recorded
Austronanus dentatus (Nordenstam 1933)[a]	*18*, 24, *52*, 56	Nordenstam (1933), Doti et al. (2005), herein recorded
Austronanus sp.	*18*, *56*	Herein recorded
Magellianira serrata Winkler 1994	28	Winkler (1994)
Meridiosignum disparitergum Doti and Roccatagliata 2009[a]	1	Doti and Roccatagliata (2009)
Meridiosignum menziesi (Winkler 1994)[a]	18, 28, 38, *52*, 56	Winkler (1994), Menzies (1962a), Doti and Roccatagliata (2009), herein recorded
Meridiosignum undulatum Doti and Roccatagliata 2009[a]	1	Doti and Roccatagliata (2009)
Meridiosignum sp.	*56*	Herein recorded
Munnogonium falklandicum (Nordenstam 1933)[a]	24, 41	Nordenstam (1933)
Munnogonium globifrons Menzies 1962	38	Menzies (1962a)
Munnogonium tillerae (Menzies and Barnard 1959)	27, 28	Winkler (1994)
Munnogonium sp. A[a]	*15*, *18*, *21*, 29, 30	Centurión and López Gappa (2012), herein recorded
Munnogonium sp. B[a]	*5*	Herein recorded
Neasellus kerguelensis Beddard 1886	4	Beddard (1886)

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Table 2 (continued)

Species	Square numbers[b]	References
Omonana brachycephala Just and Wilson 2004[a]	*21*, 28	Just and Wilson (2004), herein recorded
Omonana parasimplex (Winkler 1994)	28, 46, 56	Winkler (1994), Brandt et al. (1999)
Paramunna integra Nordenstam 1933[a]	*9*, *18*, 24, 41, 46, *47*, 48, *52*, 55, 56	Nordenstam (1933), Brandt et al. (1999), Doti et al. (2005), herein recorded
Paramunna integra sensu Winkler 1994	27, 28	Winkler (1994)
Paramunna cf. *integra* Nordenstam 1933	55	Thatje and Brown (2009)
Paramunna sp.	*18*, 46, 55, *56*	Brandt et al. (1999), herein recorded
Paramunna serrata sensu Nordenstam 1933[a]	23, 24	Nordenstam (1933)
Paramunna subtriangulata sensu Winkler 1994	28	Winkler (1994)
Paramunna subtriangulata sensu Menzies 1962b	38	Menzies (1962a)
Pleurosignum chilense Menzies 1962	38, 46, 55, 56	Menzies (1962a), Brandt et al. (1999)
Pleurosignum cf. *chilense* Menzies 1962	*18*, *48*	Herein recorded
Pleurosignum elongatum Vanhöffen 1914[a]	24	Nordenstam (1933)
Pleurosignum cf. *elongatum* Vanhöffen 1914	37	Thatje and Brown (2009)
Pleurosignum magnum Vanhöffen 1914[a]	*18*, 24, 41, *52*, 56	Nordenstam (1933), Doti et al. (2005), herein recorded
Quetzogonium dentatum (Winkler 1994)[a]	*18*, 28, 46, *47*, 48, 56	Winkler (1994), Brandt et al. (1999), Doti and Roccatagliata (2005), herein recorded
Sporonana sp.	*15*, *18*, *21*, 29, 30, 48, *52*, 56	Doti et al. (2005), Centurión and López Gappa (2012), herein recorded
Xigonus patagoniensis (Winkler 1994)[a]	27, 28	Winkler (1994)
Xigonus sp.	*48*, *56*	Herein recorded
Zyzzigonium magellanensis (Winkler 1994)[a]	*18*, 28, 46, 55, 56	Winkler (1994), Brandt et al. (1999), herein recorded
Zyzzigonium cf. *magellanensis* (Winkler 1994)	55	Thatje and Brown (2009)
Santiidae		
Santia compacta Sivertsen and Holthuis 1980[a]	*18*, *21*, 27, 28, 29, 30, 56	Winkler (1993), Lorenti and Mariani (1997), Brandt et al. (1999), Doti et al. (2005), Centurión and López Gappa (2012), herein recorded
Santia hispida (Vanhöffen 1914)[a]	*18*, *21*, 24, 27, *48*, *52*, 56	Nordenstam (1933), Winkler (1993), Brandt et al. (1999), herein recorded
Santia mawsoni (Hale 1937)	38	Menzies (1962a)
Stenetriidae		
Tenupedunculus acutus (Vanhöffen 1914)[a]	7, 13	Schultz (1982)
Tenupedunculus beddardi (Kussakin 1967)	12, 16	Kussakin (1967), Schultz (1982)
Tenupedunculus dentimanum (Kussakin 1967)	12, 16	Kussakin (1967), Schultz (1982)
Tenupedunculus drakensis (Schultz 1982)	58	Schultz (1982)
Tenupedunculus haswelli (Beddard 1886)	4	Beddard (1886), Kussakin (1967), Schultz (1982)
Tenupedunculus inflectofrons (Schultz 1982)[a]	2, 30, 42	Schultz (1982)
Tenupedunculus pulchrum (Schultz 1982)	8, 10	Schultz (1982)
Tenupedunculus serraticaudum (Kussakin and Vasina 1984)	36	Kussakin and Vasina (1984)
Tenupedunculus smirnovi (Vasina 1982)	17	Vasina (1982)
Tenupedunculus virginale (Schultz 1982)	42	Schultz (1982)

Menzies (1962a) reported *Santia dimorpha* only for its type locality (Guaiteca Island, 43°53′45″S, 73°44′30″W). More recently, Lancellotti and Vásquez (2000) extended the distribution of *S. dimorpha* from Chiloe south to Cape Horn without giving the source of these new data. This species is not included in the Appendix because this extension in the distribution needs confirmation

González et al. (2008) reported the Antarctic species *Cryosignum lunatum* (Hale, 1937) [= *Paramunna lunata* (Hale, 1937)] from Chile (50°–54°S) without giving the source of this record. Thus, this species is also excluded from the Appendix

[a] Species counted in the comparison of the Pacific and Atlantic faunas from the Magellan Region

[b] Square numbers in *italics* stand for new records of distribution

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