

On the biogeography of Cumacea (Crustacea, Malacostraca). A comparison between South America, the Subantarctic Islands and Antarctica: present state of the art*

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SUMMARY: Cumacea (Crustacea) were collected during the "Joint Magellan" expedition in November 1994, by means of an epibenthic sledge from RV "Victor Hensen". The cumaceans were well represented, the second abundant order after the amphipods, among the other Peracarida in depth ranges between 25 and 665 m. Twenty-five species were found in the samples mainly from the Beagle Channel, nine of them were already known for this region. 14 species were recorded for the first time for this region, 2 of them were known from the northern Argentinian coast and one from Antarctica. The most important in terms of species richness and abundance were the families Diastylidae, Nannastacidae and Leuconidae. In the Beagle Channel an almost completely different cumacean fauna was found compared to the Subantarctic Islands, the Antarctic Peninsula and eastern Antarctic (Prydz Bay) regions. Comparison of published data and the present results show moderate overlap in the cumacean fauna at the species level between the periantarctic South Georgian shelf / Antarctic Peninsula (48%). Little correspondence at the species level was found between Antarctica / Subantarctic Kerguelen (14%), South Georgia / Kerguelen (13%) and Magellan / Antarctica (11%). Interestingly, the Magellan region and South Georgia show very little species overlap (5%). It is concluded that the Antarctic shelf regions were not colonized from the Magellan region via the Scotia Arc.

Key words: Cumacea, Antarctica, Subantarctic region, biogeography.

RESUMEN: SOBRE LA BIOGEOGRAFÍA DE CUMACEA - UNA COMPARACIÓN ENTRE AMÉRICA DEL SUR, LAS ISLAS SUBANTÁRTICAS Y LA ANTÁRTIDA: ESTADO DE LA CUESTIÓN. - Durante la campaña "Joint Magellan" con el B/I "Victor Hensen" en noviembre de 1994 se capturaron Cumacea (Crustacea) con una draga epibentónica. Los cumáceos estuvieron bien representados, después de los anfipodos fueron los más abundantes entre los otros Peracarida en ámbitos de profundidades entre 25 y 665 m. Se encontraron veintitrés especies en las muestras obtenidas en el Canal del Beagle, nueve de las cuales eran ya conocidas para la región. Se han registrado catorce especies por primera vez para esta región, cuatro de ellas se habían citado en la costa norte de Argentina. Las familias Diastylidae, Nannastacidae y Leuconidae fueron las más importantes con respecto a diversidad de especies y abundancia. En el Canal del Beagle se encontró una fauna de cumáceos casi completamente diferente comparada con la de las islas subantárticas, de la Península Antártica y de las regiones en el este de la Antártida (Prydz Bay). Comparaciones de los presentes resultados con datos publicados muestran una sobreposición moderada de la fauna de cumáceos a nivel de especies entre la plataforma periantártica de Georgia del Sur y la Península Antártica (48%). Se encontraron pocas coincidencias entre la Antártida y las Kerguelen subantárticas (15%), entre Georgia del Sur y las Kerguelen (13%) y entre la región de Magallanes y la Antártida (11%). Es interesante destacar que la región de Magallanes y Georgia del Sur casi no tienen especies en común (5%). Se concluye que las regiones de la plataforma antártica no fueron colonizadas desde la región de Magallanes vía el Arco de Escocia.

Palabras claves: Cumacea, Antártida, región subantártica, biogeografía.

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INTRODUCTION

Very little is known about the fauna of the southern tip of South America and some parts of the Antarctic in general. This is especially true for the cumaceans of the Magellan region, as there have been few benthos expeditions into this part of the world: The “Hamburgische Magellanische Sammelreise 1892/93” (Zimmer, 1902; Panning, 1957); the “Vema” expedition 1958-1961, Lamont Geological Observatory, USA, and the study from the “Joint Chilean-Italian-German Victor Hensen Campaign, 1994” (Arntz and Gorny, 1996).

In the present study the Magellan region is defined as the shelf of the South American continent south of 40°S including the Falkland Islands.

In 1902 Zimmer described five new cumacean species. Eight species were known at that time for the Magellan region. Until the early 1990s, after Bacescu and his colleagues (Bacescu and Muradian, 1974; Muradian, 1976; Petrescu, 1995) examined the “Vema”- material, 26 species were reported for the Magellan region. The present “Victor Hensen” expedition increases our knowledge on the Cumacea from this region. The Antarctic Cumacea are much better known than the Magellan species, due to the results of various international Antarctic expeditions which were undertaken since the 1950s (Ledoyer, 1993).

The major aims of the present study were:

1. to describe the composition and diversity of the Cumacea fauna in the Magellan region;
2. to examine the similarity, species overlap and endemism of the Cumacea fauna from the Magellan and the Antarctic region;
3. to discuss the question of faunal distribution in order to scrutinize whether the Antarctic was colonized from South America via the Scotia Arc.

The analyses of these aspects should help us to gain a better understanding of the interrelationship of the cumacean fauna between these regions. Published data and the present study on the Cumacea of the Magellan region are compared with the available information from Antarctica. The Antarctic is defined according to the definition of Hedgpeth (1969), including the shelf of South Georgia Island.

MATERIAL AND METHODS

Cumacea were collected during the “Joint Chilean-Italian-German *Victor Hensen* Campaign, 1994” on board the research vessel “Victor Hensen”. The largest amount of Cumacea was obtained during daytime by an epibenthic sledge (Brandt and Barthel, 1995). The results are focussed on these samples. A smaller number of Cumacea was collected by Rauschert’s small dredge (opening: 0.43 x 0.18 m)

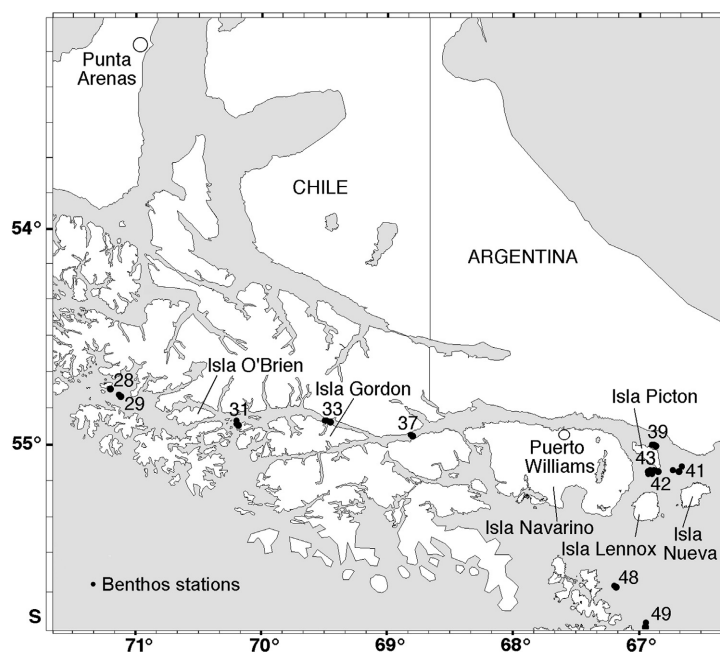


FIG. 1. – EBS stations on the transect through the Beagle Channel (modified after Arntz and Gorny, 1996). Abbreviations: 19 C. Magdalena, Pta Sánchez, 28 C. Ballenero, off Punta Baja, 29 C. Ballenero, 31 C. Beagle, I. Timbal Chico, 33 C. Beagle Romanche, 37 C. Beagle, 39. I. Gardiner, 41 SE I. Picton, 42 Pta Rico, 43 I. Picton, 48 I. Wollaston, 49 off Islas Barnevelt. For exact positions and depths cf. Table 1.

TABLE 1. – Station list of the “Joint Magellan” Expedition with RV “Victor Hensen” in 1994: epibenthic sledge stations according to depths. The first two figures in the station list are the author’s counts, the following four figures refer to the station list presented by Arntz and Gorny (1996).

Station list	date	S start	Position S end	W start	W end	depth (m)
42-1178	12/11/94	55°07.30	55°07.28	66°52.78	66°52.90	25
48-1200	14/11/94	55°38.52	55°38.57	67°12.86	67°13.26	40
41-1213	15/11/94	55°06.89	55°06.72	66°39.95	66°39.92	63
49-1206	14/11/94	55°48.13	55°48.10	66°58.45	66°58.62	66
37-1247	19/11/94	54°59.43	54°59.51	69°04.64	69°04.28	100
39-1237	18/11/94	55°00.51	55°00.48	66°53.14	66°53.29	103
43-1184	12/11/94	55°06.84	55°06.95	66°55.54	66°55.67	110
43-1197	13/11/94	55°07.92	55°08.00	66°58.28	66°58.31	117
43-1194	13/11/94	55°08.48	55°08.19	66°57.81	66°58.08	118
33-1261	20/11/94	54°53.64	54°53.81	69°58.98	69°59.03	120
29-1270	21/11/94	54°55.17	54°55.23	70°45.15	70°44.81	135
37-1248	19/11/94	54°58.80	54°58.78	69°01.75	69°01.98	217
37-1246	19/11/94	54°58.00	54°57.85	68°49.31	68°49.04	253
37-1253	19/11/94	54°55.12	54°55.11	69°19.89	69°20.13	265
19-1307	23/11/94	54°17.37	54°17.55	70°51.81	70°51.90	271
33-1257	19/11/94	54°53.43	54°53.32	69°30.94	69°31.14	350
28-1279	21/11/94	54°46.84	54°46.90	71°08.48	71°08.35	580
31-1263	20/11/94	54°54.04	54°54.00	70°12.76	70°12.52	665

equipped with a net of fine (0.3 mm) mesh size to sample smaller crustaceans. The geographical location and sampling depths of the epibenthic sledge stations are listed in detail in Table 1, for details of the dredge stations see Arntz and Gorny (1996).

A list of all Cumacea species known from the entire study region is presented herein in order to facilitate a comparison of the distribution of cumaceans from the Magellan and Antarctic regions. This list is based on Bacescu’s account

TABLE 2. – Cumacea sampled by the epibenthic sledge.

Station no. VIC HEN	1178	1184	1200	1206	1213	1237	1246	1247	1248	1253	1257	1261	1263	1270	1279	1307
Depth in m:	25	110	40	64	68	104	253	100.6	218.6	265	350	120	650	108-	640	270
Lampropidae																
<i>Hemilamprops ultimaespei</i>			119	41	744	1		178	9	2415						3
Bodotriidae																
<i>Vaunthompsonia</i> sp. 1								88						1		
Leuconidae																
<i>Leucon assimilis</i>								35	17	176						29
<i>Leucon meredithi</i>	2	1	3		53		26	34	45	60		3		26		1
<i>Leucon</i> cf. <i>meredithi</i>										1						
<i>Eudorella</i> sp.1		1260		3	2	624	45		5	8			9			
<i>Eudorella</i> sp.2							13	19					6	15		9
Nannastacidae																
<i>Campylaspis bacescui</i>							2	1	3	73			20			
<i>Campylaspis</i> cf. <i>sticta</i>								17	1	58			5			
<i>Campylaspis</i> sp.1								3	1	53					4	
<i>Campylaspis maculata</i> / <i>frigida</i>			27	1	22			60	37	289		2		43		1
<i>Campylaspis</i> sp. 2								7	1							
<i>Campylaspis</i> sp. 3							1	54	7	15				7		6
<i>Cumella</i> cf. <i>argentinae</i> 1	8	2	281	1119	231	2	25	1	169	35	1		72	22	4	4
<i>Cumella</i> cf. <i>argentinae</i> 2								127	102	37		2		25		
<i>Cumella</i> sp.1								2	1	1		1				
<i>Cumella</i> sp.2										1						
Nannastacidae indet										1	1					
Diastylidae																
<i>Diastylis argentata</i>		2				15	4	8	24	571	2	1	20	42	2	
<i>Diastylis</i> sp. 1					39			6		13						
<i>Diastylis manca</i>								9		2						1
<i>Diastylis planifrons</i>			30	28	4											
<i>Diastylopsis robusta</i>				1	1											
<i>Leptostylis</i> cf. <i>vemae</i>				12			11	343	130	5404			1	12	3	2
Total number of specimens	10	1265	460	1205	844	642	127	984	559	9158	4	6	136	226	20	16
Total number of species	2	4	6	7	8	4	8	16	14	17	3	4	8	10	6	5

(1988, 1992) and includes those studies published later by Petrescu (1991, 1994, 1995), Ledoyer (1993) and Mühlenhardt-Siegel (1994, 1996).

RESULTS

In the present investigation 25 species belonging to five families were identified from the Magellan region. Five of them are new to science. Two species were formerly described from the coast of northern Argentina and are new records for the Magellanic region; one species was formerly known from Antarctic regions. Eight species are still not identified to species level.

The highest species richness can be reported for the family of Nannastacidae (11 species). However, the most abundant species belong to the families of the Diastylidae and the Lampropidae: *Leptostylis* cf. *vemae* and *Hemilamprops ultimaespei*. The highest densities exceeded several thousand specimens per station and were found at stations 1253 and 1213 (Table 2).

The total number of species caught by the epibenthic sledge was similar to the number sampled by dredging (24 and 22) (Table 3). The comparison between the two sampling devices shows a good level of congruence at the species level. *Cyclaspis alba* was only found in the dredge samples whereas *Cumella* sp. 2 was only collected in the sledge samples. However, the sledge yielded a much higher number of specimens and species per sample than the dredge. The highest number of species per sample in the sledge samples was 17 (station 1253), in the dredge samples it was 12 (station 1124). The highest number of specimens in the sledge samples by far exceed 1500 (stations 1213 and 1253), whereas the dredge sample maximum was 529 individuals per catch (station 1124, Arntz and Gorny, 1996).

Interestingly, the samples from the Beagle Channel contain two species of the genus *Eudorella*, which are probably new to science. These two *Eudorella* species are definitely not identical with those species described from the Antarctic.

Zoogeography

As the Scotia Arc might serve as some sort of a "bridge" between the Magellan area and the Antarctic Peninsula one might expect a clear species correspondence between these regions.

TABLE 3. – Cumacea species sampled by different gear.

	Sledge	Dredge
Lampropidae		
<i>Hemilamprops ultimaespei</i>	+	+
Bodotriidae		
<i>Vaunthompsonia</i> sp. 1	+	+
<i>Cyclaspis alba</i>		+
Leuconidae		
<i>Leucon assimilis</i>	+	+
<i>Leucon meredithi</i>	+	+
<i>Leucon</i> cf. <i>meredithi</i>	+	
<i>Eudorella</i> sp.1	+	+
<i>Eudorella</i> sp.2	+	+
Nannastacidae		
<i>Campylaspis bacescui</i>	+	+
<i>Campylaspis</i> cf. <i>sticta</i>	+	+
<i>Campylaspis</i> sp.1	+	+
<i>Campylaspis maculata</i> / <i>frigida</i>	+	+
<i>Campylaspis</i> sp. 2	+	+
<i>Campylaspis</i> sp. 3	+	+
<i>Cumella</i> cf. <i>argentinae</i> 1	+	+
<i>Cumella</i> cf. <i>argentinae</i> 2	+	
<i>Cumella</i> sp.1	+	+
<i>Cumella</i> sp.2	+	
Nannastacidae indet	+	+
Diastylidae		
<i>Diastylis argentata</i>	+	+
<i>Diastylis</i> sp. 1	+	+
<i>Diastylis manca</i>	+	+
<i>Diastylis planifrons</i>	+	+
<i>Diastylopsis robusta</i>	+	+
<i>Leptostylis</i> cf. <i>vemae</i>	+	+
Total number of species	24	22

Benthos samples collected along the Antarctic Peninsula and from off the shelves of the South Orkney and South Georgia Islands (Mühlenhardt-Siegel, unpublished data) and data from the literature (Zimmer, 1907a,b, 1909, 1913; Calman, 1907, 1917, 1918; Hansen, 1908; Ledoyer, 1973, 1977, 1993; Gamô, 1987) are the basis for the cumacean zoogeography in this area of Antarctica and are presented here for the first time (Table 4).

Until now 87 Cumacea species are recorded from the entire area. Only seven of these 87 are found both in the Magellan region and in Antarctic waters. It is evident that the overlap for this crustacean taxon is less than 10 %. While 52 % of the species are endemic for the Magellan region, the endemism percentage of the Antarctic region is even higher (75%) (Table 4 and 5).

A more detailed view of cumacean species from different regions of Antarctica shows some close relationships (species overlap) between subareas (Table 6). For example the Cumacea composition of South Georgia, the South Orkneys, the South Shetland Islands and the Antarctic Peninsula shows a high species overlap (48 to 57%). However, other

TABLE 4. – Cumacea of the Magellan and the Antarctic/Subantarctic regions. (+): also described for north of 40° S; n: new record for this region; A: Argentina; C: Chile; F: Falkland Isl.

		Depth range		Sub-Antarctic		Antarctica					
						Scotia Subregion			High Antarctic		
				Mag.	Kerg.S.	Georgia	S.Ork.S.	Shetl.	Ant.P.	Wedd.	E.Ant.
min	max										
Lampropidae											
<i>Hemilamprops lotusae</i>	Bacescu, 1969	70	70	A							
<i>Hemilamprops mawsoni</i>	Hale, 1937	300	300								+
<i>Hemilamprops pellucidus</i>	Zimmer, 1907	226	3725				+	+	+	+	+
<i>Hemilamprops serrulatus</i>	Ledoyer, 1977	195	195		+						
<i>Hemilamprops ultimaespei</i>	Zimmer, 1921	12	18	C						+	
<i>Lamprops comatus</i>	Zimmer, 1907	3423	3423								+
<i>Paralamprops asper</i>	Zimmer, 1907	385	385								+
<i>Paralamprops rossi</i>	Jones, 1971	695	695						+	n	+
<i>Paralamprops serratocostatus</i>	Sars, 1887	230	230		+						
<i>Platysympus brachyurus</i>	(Zimmer, 1907)	385	385								+
Bodotriidae											
<i>Atlantocuma benguelae</i>	Bac&Mur, 1974	4893	5223	A							
<i>Atlantocuma elongatum</i>	Ledoyer, 1993	506	839							+	
<i>Atlantocuma tenue</i>	Jones, 1984	587	5000	C							
<i>Cyclaspis alba</i>	Roccatagliata, 1986	30	35	(+) n							
<i>Cyclaspis cristulata</i>	Gamo, 1987	276	289								+
<i>Cyclaspis gigas</i>	Zimmer, 1907	193	700			n	n	+	+	+	+
<i>Cyclaspis jonesi</i>	Roccatagliata, 1985	15	112	C							
<i>Cyclaspis kerguelensis</i>	Ledoyer, 1977	195	195		+						
<i>Cyclaspis quadrilaterulata</i>	Zimmer, 1907	75	75			+					
<i>Gaussicuma vanhoeffeni</i>	Zimmer, 1907	3423	3423							+	
<i>Leptocuma patagonicum</i>	Roccatagliata, 1993		shallow	A							
<i>Vaunthompsonia inermis</i>	Zimmer, 1909	24	52			+	+	+	n	n	
<i>Vaunthompsonia meridionalis</i>	Sars, 1887	15	310		+	+	+	+	n		
Leuconidae											
<i>Eudorella fallax</i>	Zimmer, 1909	64	310			+	n	n	n	n	
<i>Eudorella gracilior</i>	Zimmer, 1909	75	752			+	n	+	n	n	+
<i>Eudorella sordida</i>	Zimmer, 1907	12	250			+					
<i>Eudorella splendida/similis</i>	Zimmer, 1902	0	310		+	+		+			+
<i>Leucon adelaie</i>	Petrescu, 1991	237	237			+					
<i>Leucon antarcticus</i>	Zimmer, 1907	69	1185				n		+	+	+
<i>Leucon assimilis</i>	Sars, 1887	150	232	CAF	+		+	+	+	+	
<i>Leucon bacescui</i>	Petrescu, 1994	116	116	C							
<i>Leucon breidensis</i>	Gamo, 1987	275	289								+
<i>Leucon inexcavatus</i>	Ledoyer, 1977	31	31		+						
<i>Leucon intermedius</i>	Müh.-Siegel, 1996	280	791					+			+
<i>Leucon meredithi</i>	Petrescu, 1991	75	75	CA							
<i>Leucon parasiphonatus</i>	Müh.-Siegel, 1994	20	424					+		+	
<i>Leucon polarsterni</i>	Ledoyer, 1993	1153	1223							+	
<i>Leucon sagitta</i>	Zimmer, 1907	12	310	A	+	+	n	+	+		n
<i>Leucon septemdentatus</i>	Zimmer, 1902	1	9	CA							
<i>Leucon vanhoeffeni/kerguelensis</i>	Zimmer, 1907	1	10		+						
<i>Leucon vasilei</i>	Petrescu, 1994	3279	3279	C							
<i>Leucon weddelli</i>	Ledoyer, 1993	399	577							+	n
Nannastacidae											
<i>Campylaspis antarctica</i>	Calman, 1907	385	6134	C						+	+
<i>Campylaspis bacescui</i>	Muradian, 1976	82	1679	AF							
<i>Campylaspis breviramis</i>	Ledoyer, 1993	457	462							+	
<i>Campylaspis excavata</i>	Ledoyer, 1993	185	515				n			+	
<i>Campylaspis frigida</i>	Hansen, 1908	17	3850	A	+					+	
<i>Campylaspis johnstoni</i>	Hale, 1937	193	4402	A	+					+	+
<i>Campylaspis maculata</i>	Zimmer, 1907	6	250	n		+	n	+	+		n
<i>Campylaspis nodulosa</i>	Sars, 1887	82	5233	A	+						+
<i>Campylaspis quadridentata</i>	Ledoyer, 1993	406	506							+	n
<i>Campylaspis quadruplicata</i>	Lomakina, 1968	165	2707	CA						+	
<i>Cumella argentinae</i>	Jones, 1984	256	293	A							+
<i>Cumella australis</i>	Calman, 1907	46	385			n	n	+	+	+	+
<i>Cumella pectinifera</i>	Gamô, 1987	275	289					+			+
<i>Cumellopsis bacescui</i>	Muradian, 1979	626	934	C							
<i>Procampylaspis compressa</i>	Zimmer, 1907	385	385							+	
<i>Procampylaspis meridiana</i>	Jones, 1971	110	110								+
<i>Schizocuma molossa</i>	(Zimmer, 1907)	385	385				n				+

TABLE 4. (cont.) – Cumacea of the Magellan and the Antarctic/Subantarctic regions. (+): also described for north of 40° S; n: new record for this region; A: Argentina; C: Chile; F: Falkland Isl.

		Depth range	Sub-Antarctic		Antarctica								
			min	max	Mag.	Kerg.S.	Scotia Subregion			High Antarctic			
							S.Georgia	S.Ork.	S.Shetl.	Ant.P.	Wedd.	E.Ant.	Ross
Diastylidae													
<i>Diastylis anderssoni</i>	Zimmer, 1907	64	310				+	n	+	+	+	n	
<i>Diastylis argentata</i>	Calman, 1912	112	112	C									
<i>Diastylis corniculata</i>	Hale, 1937	218	350				n	+			+	+	
<i>Diastylis enigmatica</i>	Ledoyer, 1993	270	280								+		
<i>Diastylis galeronae</i>	Ledoyer, 1993	1165	2012								+		
<i>Diastylis gayi</i>	(Nicolet, 1849)	shallow		C									
<i>Diastylis hammoniae</i>	Zimmer, 1902	102	146	A									
<i>Diastylis helleri</i>	Zimmer, 1907	0	640				+	n	+	n	+	+	
<i>Diastylis horrida</i>	Sars, 1887	20	540		+								
<i>Diastylis inornata</i>	Hale, 1937	150	150		+							n	
<i>Diastylis manca</i>	(Sars, 1873)	95	95	(+) n									
<i>Diastylis mawsoni</i>	Calman, 1918	200	582								+	+	
<i>Diastylis planifrons</i>	Calman, 1912	12	112	CA									
<i>Diastylis pseudoinornata</i>	Ledoyer, 1977	90	90		+								
<i>Diastylis zimmeri</i>	Ledoyer, 1977	18	90		+								
<i>Diastylopsis annulata</i>	Zimmer, 1902	4	355		+	+	n	+					
<i>Diastylopsis diaphanes</i>	Zimmer, 1907	385	385									+	
<i>Diastylopsis goekei</i>	Rocca&Heard, 1992	2	311				n	+	+			n	
<i>Diastylopsis robusta</i>	(Zimmer, 1902)	4	4	CA									
<i>Leptostylis antipa</i>	Zimmer, 1907	12	310			+	n	n	n				
<i>Leptostylis chilleana</i>	Bacescu-Mester, 1967	642	642	C									
<i>Leptostylis crassicauda</i>	Zimmer, 1907	123	385		+		n	+	+	+	+	n	
<i>Leptostylis ovalis</i>	Zimmer, 1902	4	4	A									
<i>Leptostylis vemae</i>	Bacescu-Mester, 1967	70	70	A									
<i>Makrokyllindrus baceskei</i>	Lomakina, 1968	2937	2937									+	
<i>Makrokyllindrus inscriptus</i>	Jones, 1971	808	808								+	+	
Pseudocumatidae													
<i>Kerguelenica platycephala</i>	Ledoyer, 1977	195	195		+								
Ceratocumatidae													
<i>Cimmerius subantarcticus</i>	Ledoyer, 1977	196	196		+								
Total number of species					31	20	16	16	20	15	29	32	11

Antarctic regions do not show any clear relationship, e.g. Weddell Sea and Antarctic Peninsula (19%), East Antarctic and Ross Sea (16%).

DISCUSSION

Table 5 implies that the cumacean fauna of the Antarctic Peninsula would be more similar to the

Eastern Antarctic than to the adjacent Weddell Sea. It seems more likely that this is an artefact, a gap in our knowledge, than a zoogeographical problem. These observed differences in species correspondence might possibly still be due to our lack of knowledge. The genus *Eudorella* is well represented in boreal areas of the northern hemisphere with 23 species whereas only 4 species are described for Antarctic regions, but not a single

TABLE 5. – Cumacean endemism in the regions discussed.

	Subantarctic		Antarctic						
	Mag.	Kerg.	Scotia Subregion			High Antarctic			
			S.Georgia	S.Ork.	S.Shetl.	Ant.P.	Wedd.	E.Ant.	Ross
No of species	31	20	16	16	20	15	29	32	11
Endemic species	16	8	4	0	0	0	7	5	2
Endemism in %	52	40	25	0	0	0	24	16	18

TABLE 6. – Cumacean species overlap between regions.

Regions	S total	overlap S	in %
Magellan / S. Georgia	40	2	5
Magellan / Antarctic Pen.	41	3	7
Magellan/ S.Orkneys	44	2	4
Magellan/ Antarctica	73	8	11
Magellan/ Falkl., Malvinas	29	3	10
Falkl.,Malv./ Antarctica	53	1	2
Kerguelen/ Antarctica	62	9	15
Kerguelen/ S.Georgia	32	4	13
S. Georgia / Antarctic Pen.	21	10	48
S. Orkneys/ S. Georgia	22	11	50
S. Orkneys / Antarctic Pen.	21	10	48
S. Orkneys / Weddell Sea	38	7	18
S. Orkneys / East Antarctic	36	12	33
S. Orkneys / S. Shetlands	23	12	57
S. Shetlands / Antarctic Pen.	21	17	81
Antarctic Pen. / Weddell Sea	37	7	19
Antarctic Pen. / East Antarctic	33	12	36
Antarctic Pen. / Ross Sea	23	3	13
Weddell Sea / East Antarctic	46	15	33
Weddell Sea / Ross Sea	32	8	25
East Antarctic / Ross Sea	37	6	16

species of this genus was reported from the Magellan region until now.

A good example is the species *Eudorella fallax* which was recorded to be endemic to South Georgia (Table 4) in the past. Data from a series of samples from the South Orkney Islands, the South Shetland Islands, the Antarctic Peninsula, and from the Prydz Bay area, East Antarctic (Mühlenhardt-Siegel, unpublished data) show that *Eudorella fallax* occurs regularly in samples from all areas mentioned. This species can therefore no longer be regarded as endemic to South Georgia, however, it is obviously endemic for the Antarctic. The example of the cumacean genus *Eudorella* in the Antarctic region has shown the problem of low research effort in parts of the region very clearly.

Maybe a more detailed analysis of other geographical areas with adequate sampling devices like epibenthic or suprabenthic sledges will reduce the number of endemic Cumacea species in the subregions of the Antarctic. The faunal composition of the Cumacea in the waters around the entire Antarctic continent may then show different similarities than those seen at present.

Why is there so little overlap between the Magellan and the Antarctic regions?

The reason for this cumacean zoological feature may be found in the biology of these peracarids:

- Cumacea are living preferably in soft sediments or hyperbenthically, only occasionally moving into the water column,

- they are brood protecting, the early life stages are kept and sheltered in a marsupium.

Therefore there is almost no opportunity to drift and disperse over long distances and thus deep-sea areas become effective geographical barriers for shelf species.

The species composition of the Cumacea in the Magellan region and in Antarctic waters leads to the conclusion that Antarctica was probably not colonized from South America along the Scotia Arc. However, the origin of Antarctic Cumacea is still not solved. It is possible that the Antarctic Cumacea originate from an ancient Gondwana fauna or they might be closely related phylogenetically to the deep-sea fauna as are the Serolidae or Arcturidae of the Isopoda (Brandt, 1991, 1992), or the Iphimediidae of the Amphipoda (Watling and Thurston, 1989). However, hardly anything is known about Cumacea from the deep-sea close to and around the Antarctic continent. Therefore more deep sea sampling around Antarctica, from off the continental shelf, downslope towards the abyssal plains is needed in order to solve this question.

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