



CYCLOPOIDA OF THE BRANSFIELD STRAIT (ANTARCTICA, OCTOBER–NOVEMBER 1986)

ABSTRACT

The paper is based on planktonic material collected between October–November 1986 in the Bransfield Strait. The predominant cyclopoid species were: *Oithona similis* and *Oncaea curvata*. The genus *Oncaea* was concentrated in a deeper part of the studied water column than the genus *Oithona*. The distribution of Cyclopoida was modified by hydrological conditions.

INTRODUCTION

Cyclopoida (*Oithonidae*, *Oncaeidae*) are the most abundant metazoa in the ocean. Both families can exist in whole world's ocean, in the epi- and mesopelagic environments. In spite of small sizes of body, Cyclopoida are the main constituents of pelagic copepods and they are important as a food of chaetognats, larvae of pelagic fishes (Nishida, 1985).

The purpose of this paper is searching the quantitative and qualitative composition, and the vertical distribution of Cyclopoida from the Bransfield Strait.

MATERIAL AND METHODS

The planktonic material, constituting the basis of this study, was obtained by r/v „Profesor Siedlecki” from 26.10.1986 to 16.11.1986 (the austral spring). 46 samples were collected with 200 μm Nansen net. 16 stations were located in the Bransfield Strait (Fig. 1). Precise position of these stations is given by Rakusa-Suszczewski (1988). In the open ocean the sampling area was the upper 1800 m, in the neritic zone — down to the bottom. The hydrological conditions in this regions were described by Grelowski (1988).

Samples were fixed in a 4% formaline solution. In the laboratory, depending on density, Cyclopoida were examined in 2–10 subsamples of 1 ml each. The

number of specimens were related to the quantities of Cyclopoida in 1000 m³ of water (Tab. 1).

RESULTS AND DISCUSSION

The following 7 taxa of the cyclopoid fauna were recorded in the investigated water column:

suborder	Cyclopoida	
family	Oithonidae	
	<i>Oithona frigida</i>	Giesbrecht, 1902
	<i>Oithona similis</i>	Claus, 1866
	<i>Oithona sp.</i>	
family	Oncaeidae	
	<i>Oncaea conifera</i>	Giesbrecht, 1891
	<i>Oncaea curvata</i>	Giesbrecht, 1902
	<i>Oncaea notopus</i>	Giesbrecht, 1891
	<i>Oncaea sp.</i>	

The studied area was represented by two typically Antarctic cyclopoid species (*Oncaea curvata*, *Oithona frigida*) and species common to the other regions.

The most frequent and most numerous were: *Oithona similis* and *Oncaea curvata*, which occurred all planktonic samples. The percentage of the cyclopoid species in the Bransfield Strait is presented in Fig. 2.

In the Antarctic water, the domination of these two species was also observed by Fransz (1988) and Źmijewska (1988). Tanimura et al (1984), investigating the zooplankton under sea ice near Syowa Stations (Antarctica), is of an opinion that *Oithona similis* and *Oncaea curvata* can occupied 61.1-84.8% of total zooplankton number.

Oithona similis (frequency 60%) was the most abundant component of cyclopoid copepods in the studied waters. It was found in quantities ranging from 9 (st. 63, 1600-700 m) up to 149671 specimens per 1000 m³ (st. 88, 100-0 m) (Tab. 1). The highest aggregations of *Oithona similis* were noted in stations distributed in the northern part of the Bransfield Strait (st. 76, 77, 88, 91, 93). In this region, the influence of the Bellinghausen Sea water masses was observed. They are characterized by higher temperature and lower salinity in comparison with the water in the other part of the investigated area (Grelowski, 1988). *Oithona similis* was concentrated mainly in the surface layers of the water column. Its maximum numbers were recorded in the 400-0m layer. According to Źmijewska (1988) *Oithona similis* occur the whole water column but it is usually most abundant in the layer 100-300 m. The density of *Oithona similis* decreased with depth. Cyclopoid's vertical distribution of the Bransfield Strait is shown in Fig. 3.

Oncaea curvata also belonged to the species occurring in greatest numbers in the Bransfield Strait (31.4%) (Fig. 2). This is a typical cyclopoid species for the Bransfield Strait waters (Jazdzewski et al 1982). The abundance of *Oncaea curvata* ranged from 248 (st. 63, 600-700 m) to 41201 ind. per 1000 m³ (st. 93, 100-0m) and rather increased with depth (Fig. 3). The greatest concentration of *Oncaea curvata* was noted in the 300-100 and 500-100 m layers.

The occurrence of *Oithona frigida* was relatively low (2.5% of total Cyclopoida) (Fig. 2). *Oithona frigida* reached its maximum abundance (3333 ind./1000 m³) in the 400-100 m layer (st. 76). The distribution of this species was similar to that of *Oithona similis*. *Oithona frigida* occupied the whole water column but was less frequent. It preferred the upper 500 m layers and rather avoiding the 100-0m layer (st. 56, 77, 88) (Tab. 1) (Fig. 3).

Oncaea conifera occurred everywhere, but its maximum of nearly 3000 ind./1000 m³ was found in station 56 and 93. This copepod was concentrated mainly in the 500-100 m layer (Tab. 1) and was observed increasing its density with depth likely to *Oncaea curvata* (see also Jazdzewski et al 1982) (Fig. 3).

The remaining representatives of Cyclopoida in the Bransfield Strait: *Oithona sp.*, *Oncaea notopus*, *Oncaea sp.*, occurred irregularly and were less numerous.

Oithona sp. (1.8%) reached 11622 ind./1000 m³ (st. 91) in the 100-0m layer. This species was presented in the surface water only (Tab. 1).

Oncaea notopus reached its maximum 2467 ind./1000 m³ in station 93 (500-100 m) and *Oncaea sp.* 101 ind./1000 m³ only in st. 70 (1400-700 m). Both species significantly preferred the deep zone of the investigated area (Tab. 1, Fig. 3). Before a such tendency for *Oncaea notopus* was described by Hardy and Gunther (1935).

Cyclopoid copepods were an important and regular component of spring zooplankton in the Bransfield Strait. This consideration is supporting by earlier observations. According to Fukuchi et al (1985) Cyclopoida are the predominant among Antarctic copepods. Voronina (1984) suggested that the percentage of Cyclopoida can be as high as 80% of total small-sized copepods. In the Antarctic waters the predominance of small Cyclopoida, especially *Oncaea* and *Oithona*, was observed recently (Fransz 1988, Żmijewska 1988). Similar results were obtained in this study. *Oithona similis* and *Oncaea curvata* were the leading populations in the Bransfield Strait.

The vertical distribution of Cyclopoida in this region shows that the cyclopoid's density in the upper 400 m were the highest for *Oithona similis*. In general the genus *Oncaea* inhabited deeper layers than the representatives of *Oithona* however the pattern of Cyclopoida distribution was different in st. 93. In this part of the Bransfield Strait hydrological conditions were not stable (Grelowski, 1988). It was found that diversity of cyclopoid species increased with depth.

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CYCLOPOIDA WÓD CIEŚNINY BRANSFIELDA (ANTARKTYKA, PAŹDZIERNIK-LISTOPAD 1986,

Streszczenie

Przebadanie Cyclopoida wód Cieśniny Bransfielda z wiosny 1986, miało na celu określenie ich zróżnicowania gatunkowego i rozmieszczenia w kolumnie wody. Materiał do badań stanowiło 46 prób planktonowych zebranych siecią planktonową Nansena (200 μm) z 16 stacji usytuowanych w C. Bransfielda (Fig. 1). Stwierdzono mało zróżnicowany skład gatunkowy Cyclopoida tam występujących (7 gatunków). Liczba gatunków rosła wraz z głębokością (Tab. 1). Najliczniej wystąpiły *O. similis*, *O. curvata*. (Fig. 2). Oithonidae zamieszkiwały głównie wody powierzchniowe do głębokości 400 m, podczas gdy Oncaeidae preferowały wody głębsze (Fig. 3). Rozmieszczenie Cyclopoida zależne było od warunków hydrologicznych. Cyclopoida były stałym elementem zooplanktonu na całym obszarze badań.

Table 1. Cyclopoda taxa found in analyzed samples. Abundance values in specimens per 1000 m³

st.	m	<i>Oithona</i> <i>cimilis</i>	dom. %	<i>Oithona</i> <i>frigida</i>	dom. %	<i>Oithona</i> ?	dom. %	<i>Oncaea</i> <i>curvata</i>	dom. %	<i>Oncaea</i> <i>conifera</i>	dom. %	<i>Oncaea</i> <i>notopus</i>	dom. %	<i>Oncaea</i> <i>sp.</i>	dom. %
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
56	100-0	9053	-	-	-	1500	-	737	-	158	-	-	-	-	-
	500-100	4220	28.1	1753	4.4	-	3.0	14987	49.5	2796	8.0	2467	7.0	-	-
	1000-500	757	-	460.5	-	-	-	9046	-	1020	-	-	-	-	-
57	100-0	18684	-	53	-	105	-	316	-	-	-	-	-	-	-
	300-100	32960.5	72	1513	3.1	39	0.3	1079	20.3	355	2.6	92	1.7	-	-
	700-300	105	-	58	-	-	-	1023	-	632	-	251	-	-	-
1500-700	1501	-	678	-	59	-	12603	-	925	-	925	-	-	-	
59	85-0	5449	27.1	464	2.3	-	-	13220	65.8	681	3.4	279	1.4	-	-
61	100-0	1710.5	-	263	-	-	-	11579	-	105	-	-	-	-	-
	400-100	2246	15.8	228	1.9	-	-	8555	80.3	88	0.8	307	1.2	-	-
63	100-0	3053	-	53	-	53	-	658	-	316	-	210.5	-	-	-
	500-100	24326	72.3	395	2.0	-	0.1	965	18.1	395	5.4	88	2.1	-	0.02
	700-400	482	-	307	-	-	-	5132	-	1096	-	439	-	-	-
	1600-700	9	-	15	-	-	-	248.5	-	295	-	67	-	9	-
64	100-0	31737	-	710.5	-	158	-	1710.5	-	-	-	-	-	-	-
	500-100	13158	53.1	2039	3.6	66	0.3	18783	37.1	1678	2.9	1579	3.0	-	-
	800-500	833	-	395	-	-	-	11447	-	833	-	1009	-	-	-
68	100-0	13842	-	342	-	184	-	5026	-	237	-	105	-	-	-
	300-100	19934	42.5	1908	4.3	-	0.2	24342	51.5	263	0.9	-	0.6	-	-
	600-300	6652	-	1829	-	-	-	19737	-	364	-	513	-	-	-
69	100-0	10632	-	53	-	132	-	6684	-	132	-	-	-	26.3	-
	400-100	8684	33.6	1272	2.3	132	0.5	26272	57.3	1535	2.9	1930	3.4	8.8	0.06
70	300-0	7763	-	1053	-	-	-	6623	-	833	-	307	-	-	-
	450-300	2456	-	1667	-	-	-	20702	-	2544	-	2632	-	-	-
	700-450	158	16.2	368	4.9	-	-	12105	63.9	1000	8.6	737	6.2	-	0.2
	1400-700	184	-	109	-	-	-	2143	-	1203	-	327	-	101.5	-
76	100-0	28158	-	-	-	1053	-	1842	-	132	-	-	-	-	-
	400-100	55702	66.6	3333	3.6	-	0.8	18860	25.5	1579	2.2	877	1.3	-	-
	700-400	1930	-	1272	-	-	-	12105	-	1096	-	789	-	-	-
77	100-0	45829	-	-	-	2184	-	2632	-	210.5	-	-	-	-	-
	400-100	45066	81.4	1754	1.6	-	1.9	12171	13.2	1206	1.3	658	0.6	-	-
80	100-0	7421	-	53	-	158	-	737	-	-	-	-	-	-	-
	400-100	15395	40.7	482	0.9	-	0.3	7895	15.3	439	0.3	-	-	-	-
85	150-0	60088	-	439	-	2921	-	10228	-	289	-	-	-	-	-
	500-100	3665	54.8	219.5	3.0	-	2.5	17575	34.0	2444	3.5	1692	2.2	-	-
	800-500	307	-	219	-	-	-	11930	-	1403.5	-	921	-	-	-
88	100-0	149671	-	-	-	6908	-	1316	-	-	-	-	-	-	-
	400-100	2193	87.5	307	0.2	-	4.0	965	7.2	395	0.8	132	0.3	-	0.02
	800-400	789	-	33	-	-	-	10263	-	987	-	395	-	33	-
91	100-0	112276	-	218	-	11622	-	2850	-	-	-	-	-	-	-
	500-100	28234.5	77.8	1533	1.2	-	6.4	9877	12.8	1041	0.8	1151	1.0	-	-
	800-500	965	-	614	-	-	-	10395	-	351	-	658	-	-	-
93	100-0	51974	-	263	-	2895	-	29737	-	395	-	-	-	-	-
	500-100	10444	42.2	3207	2.3	740	2.4	41201	48.4	3207	2.9	2467	1.7	-	0.02
	1000-500	16	-	-	-	-	-	295	-	526	-	37	-	21	-
	1800-1000	201	-	10	-	-	-	533	-	217	-	46	-	6.6	-

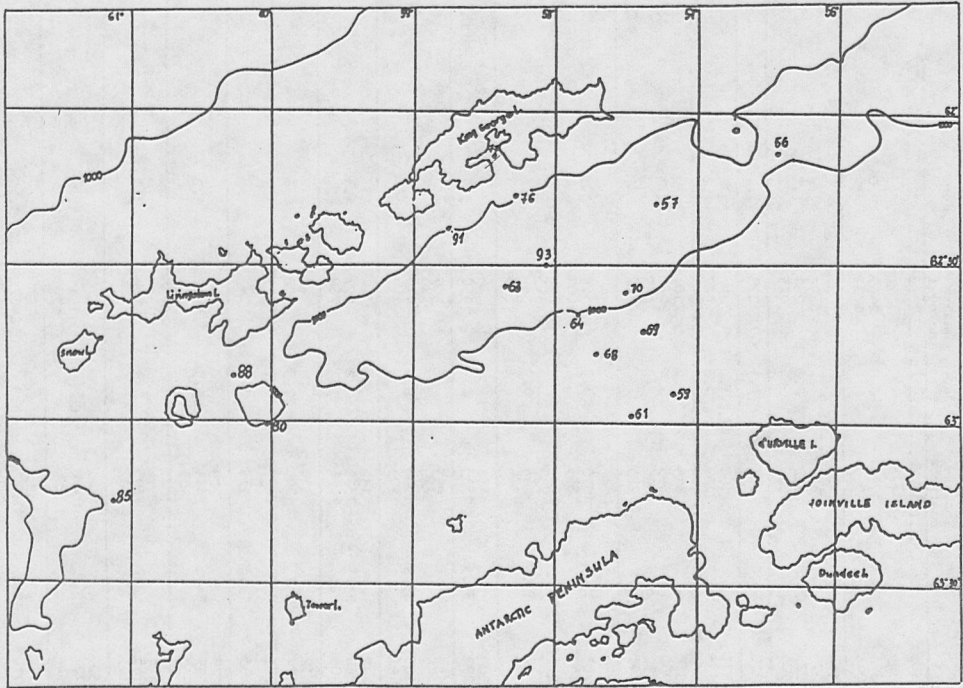


Fig. 1. Location of sampling stations

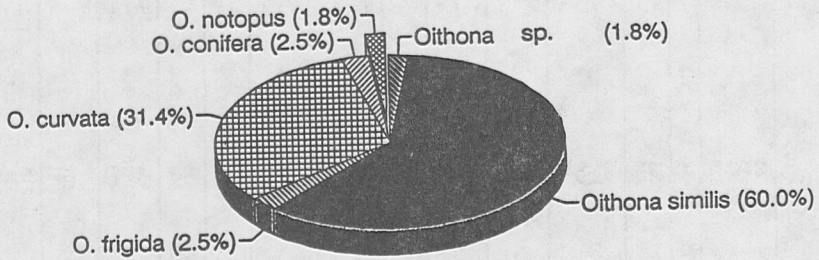


Fig. 2. Composition of the Bransfield Strait Cyclopoida

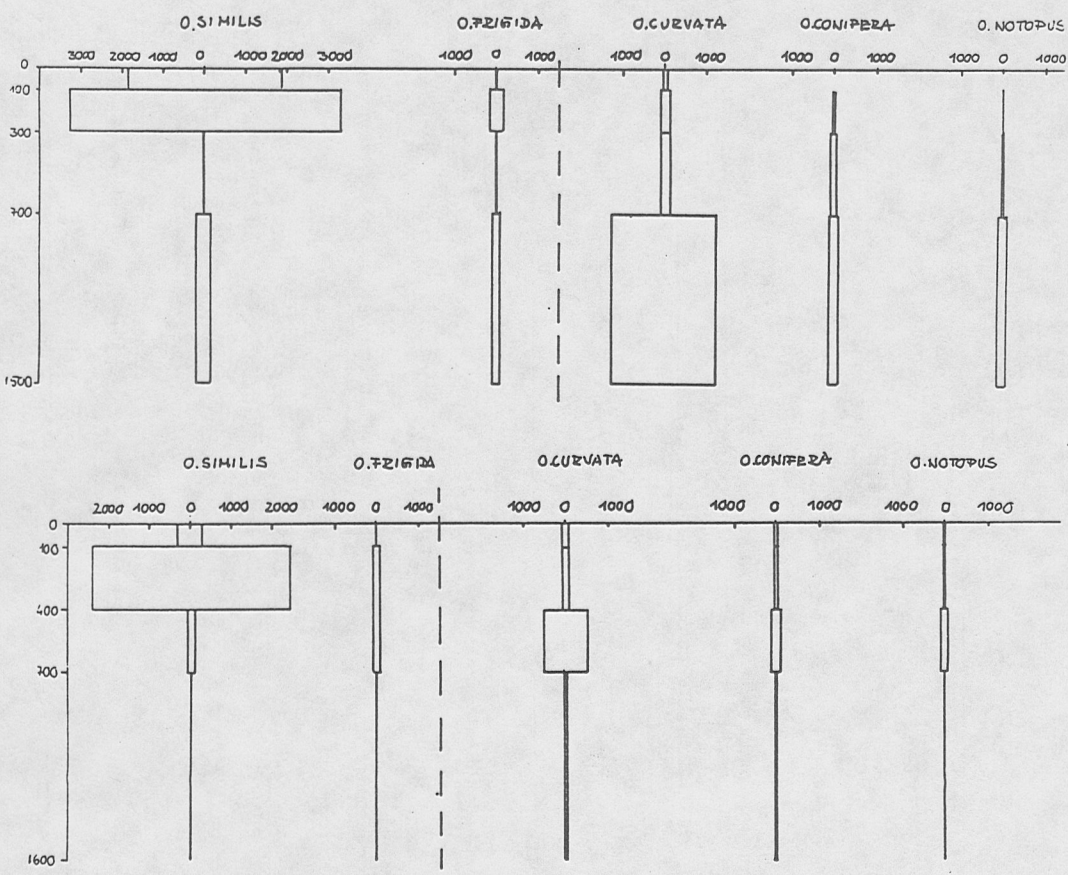


Fig. 3. The vertical distribution of Cyclopoida in the studied water column (October-November 1986)