COPEPODS: MAIN ZOOPLANKTERS IN ADMIRALTY BAY, KING GEORGE ISLAND, ANTARCTICA

Theresinha Monteiro Absher*, Marcella Mordaski Córdova, Augusto Luiz Ferreira Junior, Yargos Kern

Centro de Estudos do Mar - Universidade Federal do Paraná. Av. Beira-Mar, s/n. C P 61, CEP 83255-971, Pontal do Sul, Pontal do Paraná-PR, Brazil.

*e-mail: tmabsher@ufpr.br

Abstract: Copepods have a major role in zooplankton communities worldwide and are very important in Polar ecosystems; they form the base of the trophic web, contributing through accumulation of great energy reserves. For this work, fifty five samples were collected in Admiralty Bay, King George Island, Antarctica during the summer of 2009. A total of 15,328 copepods were sorted, *Rhincalanus gigas*, *Macrosetella gracilis*, *Clausocalanus* sp. and another five taxa were identified.

Keywords: Zooplankton, Copepods, Admiralty Bay, Antarctica

Introduction

Polar regions are of great scientific and economical importance due to the abundance of natural resources and they contribute for understanding climatic and environmental changes. The stocks of zooplankton in polar oceans are mainly of herbivores copepods and euphausiids that form the base of the trophic web. They contribute to the balance of the pronounced primary production through accumulation of energy reserves (Kattner & Hagen, 1995).

Copepods dominate Antarctic marine zooplankton and may represent 90 to 97% of the biomass and are well documented (see Kittel, 2000) and specifically the dominance of *Metridia gerlachei* Giesbrecht, 1902 in waters around King George Island (Jażdżewski *et al.* 1982; Żmijewska, 1988). With the purpose of contributing to the monitoring program, INCT- APA - Thematic Module 3, this study aims to provide data on the density of copepods of the coastal environment of Admiralty Bay.

Materials and Methods

The samples were collected from five shallow areas at Admiralty Bay in 11, 15, 23 and 29 December 2009. Location of the sampling stations were: #1 62°05'00"S; 58°23'01"W; #2 62°05'46"S; 58°19'58"W; #3 62°05'22"S; 58°28'11"W;

#4 62°09'12"S; 58°29'06"W; #5 62°09'23"S; 58°27'56"W (Figure: 1).

Plankton samples were collected in three replicates in all stations from five minutes oblique tows at 2 knots from the sea bottom (30m) to the water surface. A conical net with a 150 µm mesh size and 60 cm diameter equipped with a flowmeter was used. Samples were preserved in 4% buffered formaldehyde. Zooplankton organisms were identified in high taxonomic levels and copepods were separated for identification to species level when possible. The values have been corrected to a standard 100 m³.

Analysis of variance (ANOVA) was used at a significance level of $p=0.05$ to determine the statistical difference in the density among sampling days and stations. When appropriate a log (x+1) transformation was employed.

Results

Fifty five samples were collected and a total of 15,328 copepods were sorted. Copepods dominated in the majority of stations and dates. The average abundance varied from 19.5 to 3,305 organisms.100m⁻³. Density variation was higher between dates (minimum of 3 on december 23th, maximum of 4,733 organisms.100m⁻³ on 29th) than on stations (largest variation #4, from 16 to 143 organisms.100m⁻³). The mean

Figure 1. Location of sampling stations in Admiralty Bay.

numbers of copepods per station and date are shown in Figure 2. Copepods mean density was high in station #5 (29 Dec.) and #4 (15 Dec.).

The following taxa were identified: Panteidae sp., *Macrosetella gracilis*, *Clausocalanus* sp., Phyllopodidae sp. 1., *Parvocalanus* sp., *Metridia gerlachei*, *Haloptilus* sp. and *Rhincalanus gigas* (larger individual sampled Figure 3).

ANOVA results indicated significant difference among dates ($p < 0.05$) and no significant difference among stations ($p = 0.56$).

Discussion and Conclusion

Copepods expressive abundance observed in this work during late summer may be associated to the great primary production registered in this period (Tenorio *et al.*, 2010). *Metridia gerlachei* is well known for its abundance in Antarctic regions (see Table 1) Jażdżewski *et al.* (1982) registered *Metridia gerlachei* in the Bransfield Strait, however *Clausocalanus* sp. were nearly absent in the Bransfield. Both species were registered in the present study at Admiralty Bay.

Figure 2. Copepods density per stations and date.

Table 1. Copepod species, occurrence, and citation (AB: Admiralty Bay; BS: Bransfield Strait; DP: Drake Passage; LS: Lazarev Sea; WS: Weddel; GS: Gerlache Strait; CP: Croker Passage).

Location	<i>Metridia gerlachei</i>	<i>Clausocalanus</i> sp.
AB	This paper; Siciński et al 1996.	This paper; Jażdżewski et al 1982
DP	Calbet & Irigoien 1997	Jażdżewski et al 1982
BS	Jażdżewski <i>et al.</i> , 1982; Bonicelli <i>et al.</i> , 2008;	
BS	Żmijewska 1988; Calbet & Irigoien 1997	
WS	Schnack-Schiel & Hagen, 1995; Kahle & Zauke 2003	Park & Wormuth 1993
LS	Froneman <i>et al.</i> , 1996	
GS	Calbet & Irigoien 1997	
CP	Hopkins 1985

Figure 3. Larger individual sampled (station # 5 female of *Rhincalanus gigas*).

One of the factors that may have influenced the abundance of copepods is inter-specific competition. Admiralty Bay serves, in all likelihood, as a refuge for

components of plankton, especially the copepods that find a favorable environment for reproduction and development.

The high densities observed near the entrance of the Bay (St # 4, 5) may be due to circulation patterns. The waters flowing into Admiralty Bay come from the western part of the Bransfield Strait (Madejski & Rakusa-Suszczewski, 1990). Those waters are responsible for supplying the ecosystem with zooplankton species, nutrients and organic matter.

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