PHYTAL MACROFAUNA COMPOSITION OF THE *Himantothallus grandifolius* (HETEROKONPHYTA, DESMARESTIACEAE) FROM ADMIRALTY BAY (KING GEORGE ISLAND, SOUTH SHETLAND ISLANDS, ANTARCTICA)

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Abstract: Phytal ecosystems are characterized as an important area of production and energy transference, due to the complex trophic web that naturally establishes between diverse organism groups that co-inhabit this eutrophic region. Benthic organisms, especially of the macro- and meiobenthic, constitute the associated fauna of the phytal kelps. *Himantothallus grandifolius* is the most prominent Antarctic kelp species. It is usually found in the Antarctic Peninsula Islands of the Maritime Antarctic region, despite the ecological importance of associated fauna. The present work has the objective to evaluate qualitatively and quantitatively the macrofauna phytal of the *H. grandifolius* collected in February 2011 at Mackellar inlet (Admiralty Bay), with special focus on taxonomic determination of the associated Isopods fauna. Preliminary results showed that the dominant faunal group was Amphipods ($n = 1776$), followed by Ectoprocta ($n = 496$). Isopods occurred in fewer density ($n = 207$ ind.) and so far have been identified at the following family level (Gnathiidae, Munnidae, Plakarthidae, Jaeropsidae, Sphaeromathidae and Janiridae).

Keywords: Kelps, *Himantothallus grandifolius*, phytal fauna, Isopods

Introduction

The seaweed and seagrass communities have a great importance in the development of invertebrate and vertebrate communities, creating favorable conditions of habitat, shelter, feeding, reproduction and development for the life cycles of various marine organisms. The marine biocenosis constituted by animals that live associated to these plant-substrates is designated phytal (Masunari & Forneris, 1981; Remane, 1933; Masunari, 1987). Phytal communities are mainly composed by invertebrates of the macrofauna (0.5 to 2 mm) and meiofauna (0.045 to 0.5 mm) size classes. In Admiralty Bay Antarctica, especially in, phytal communities are very little studied (Pabis & Sincinski,

2010; Sicinski *et al.*, 2011). Over all, in Admiralty Bay there are some 36 macroalgae species (Zielinski, 1990) and the Desmarestiaceae is the most common family. From the 36 species *Himantothallus grandifolius* is the most common kelp in the whole Bay. *H. grandifolius* a Heterokontophyta algae constituted by leaf-like thallus with corrugate edges narrowing downwards forming a short stipe, which can reach a large size both in width, more than 1m, and depth of between 5-15 m in total length. This kelp is found attached to rocks and stones by a great number of appendages forming a strong holdfast. Thallus and holdfast of these large brown algae are considered to be structurally complex habitats

(Steneck *et al.*, 2002), consisting in a rich aggregation in a sublittoral zone ranging within a depth of 10 to 90 m (Zielinski, 1990).

Phytoplankton fauna of the Admiralty Bay is often composed of Amphipods, Isopods, Polychaetes, bryozoans and ascidians like the phytal in other places of the world (Mukai, 1971; Kito, 1975; Hicks, 1977; Coull & Wells, 1983; Johnson & Scheibling, 1987; Preston & Moore, 1988; Curvêlo & Corbisier, 2000; Krzysztof & Sicinski, 2010). There are few studies on Antarctic macroalgae phytal communities, despite their great importance in marine coastal ecosystems. The aim of the present study was to describe phytal macrofauna composition associated to *H. grandifolius* in Admiralty Bay, emphasizing Isopod fauna composition.

Materials and Methods

Admiralty Bay is located in the King George Island in the central region of South Shetlands Archipelago (Rakusa-Suszczewski, 1980) 62° 05' S and 58° 24' W. The bay covers some 122.08 km² (Battke, 1990) and is comprised of three inlets, Martel, Mackellar and Ezcurra. It is the largest bay of King George Island, and about 30% of the bottom of Admiralty Bay is covered by macroalgae. The specimen of *Himantothallus grandifolius* was collected in Mackellar inlet near Peruvian Station of Machu Pichu up at 15 meters deep in February 2011. The specimen measured approximately 8 m long and 60 cm wide. The holdfast was circular and the diameter was approximately 45 cm. After collecting this specimen, it was stored and frozen immediately. In Brazil, the specimen was thawed (defrosted) at room temperature (25 °C) in Macroalgae laboratory (Biology Institute/UFRJ). During thawing, the organisms associated to seaweed were carefully collected and immediately fixed in neutralizing formaldehyde 4%. The holdfast was washed to remove the sediment and organisms. The sediment was elutriated and the supernatant was poured on two sieves with meshes of 0.500 and 0.045 mm to separate the macrofauna and meiofauna organisms. Macrofauna organisms were sorted into higher taxonomic levels (Phylum, Class, Order, and others). The Isopods were separated for preliminarily taxonomic identification to Family level and expressed in number of individuals found across the seaweed thallus and holdfast.

Table 1. Composition and density (nº.ind.) of phytal macrofauna organisms found on *Himantothallus grandifolius*.

Taxon	Holdfast region	Tallus region
Acari	2	0
Amphipoda	1767	116
Asteroidea	3	2
Bivalvia	33	3
Copepoda	181	0
Cumacea	1	0
Gastropoda	71	7
Holoturoidea	2	0
Nematoda	281	0
Nemertea	3	0
Ofiuroidea	3	5
Oligochaeta	7	0
Ostracoda	20	0
Polyplocophora	19	4
Polychaeta	158	9
Ectoprocta	472	32
Gnathiidae*	71	0
Sphaeromatidae*	1	0
Plakarthriidae*	74	0
Munnidae*	41	0
Janiridae*	3	0
Jaeropsidae*	2	0
Total	3215	178
Total Holdfast and tallus		3393

* Isopod Families

Results

The preliminarily results showed that phytal fauna of *Himantothallus grandifolius* were composed by a diversity of organisms: Acari, Crustacea, Mollusca, Echinodermata, Nematoda, Nemertea, Annelida and Ectoprocta (Table 1). Amphipod was the dominant group (n = 1776 ind), followed by Ectoprocta (n = 496 ind). Isopod found in fewer individuals (n = 207 ind) and the families were Gnathiidae,

Figure 1. Isopods families associated to *Himantothallus grandifolius* sampled in Admiralty Bay (King George Island, Antarctica). a) Plakarthriidae; b) Gnathiidae; c) Munnidae; d) Janiridae; e) Jaeropsidae; and f) Sphaeromathidae.

Munnidae, Plakarthidae, Jaeropsidae, Sphaeromathidae and Janiridae (Figure 1).

The holdfast was the thallus region with the greater diversity. There are a relatively small number of studies focused on the fauna of Antarctic and Subantarctic macroinvertebrates associated with holdfasts of various macroalgae (Arnaud, 1974).

Discussion

Frequently, the dominant groups of the phytal fauna are Peracarids Crustacea, especially Amphipods, Isopods, Tanaidaceans (Mukai, 1971; Kito, 1975; Hicks, 1977; Coull & Wells, 1983; Johnson & Scheibling, 1987; Preston & Moore, 1988; Curvêlo & Corbisier, 2000), similar with the faunal composition observed in the present work. Through the taxonomic identification it has been possible from the results obtained so far to suggest that holdfast was the region with the greatest diversity of organisms. The latter can be explained by the morphological aspects of the holdfast such as textures and interstitial spaces that accumulate sediment, debris and epiphytes, in addition to providing a greater degree of protection from wave exposure and predators (Muralikrishnamurthy, 1983; Preston & Moore, 1988).

The Antarctic marine environment is very peculiar, and presents features like extremely low and stable seawater

temperature, 4 °C a -70 °C, marked differences in the incidence of light throughout the year, small fluctuations in salinity during the summer and a marked seasonality in food resource input in relation to the annual cycle of primary productivity (Gutt, 2007). In this environment, large macroalgae (Kelps) modify physical factors such as light or water movement and can play a fundamental role on the distribution patterns and diversity of the marine organisms (Reed & Foster 1984, Bulleri *et al.*, 2002).

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