

Plant Composition of Skuas Nests at Hennequin Point, King George Island, Antarctica*

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ABSTRACT

We investigate the plant composition in the Skuas nest at Hennequin Point, located in the Admiralty Bay Area, King George Island, Antarctica. Sample of 61 activity nests were analyzed. 21 plant and lichenized fungi species were found in the nest composition, being the mosses *Sanionia uncinata* (Hedw.) Loeske and *Polytrichastrum alpinum* (Hedw.) G. S. Smith the most frequent species found in the Skuas nests. *Usnea antarctica* Du Rietz was the most frequent lichen and the grass *Deschampsia antarctica* Desv was the most frequent flowering plant found in the nests. These results contribute for the environmental management of the Admiralty Bay area research activities.

Keywords: Plant Communities; Sea Bird Nests; Mosses; Lichen

1. Introduction

The Antarctic flora is composed mainly by mosses and lichens adapted to short summer periods and very low temperatures [1]. Such climatic conditions inhibit the reproductive cycle, limiting the occurrence of species, especially of flowering plants [2]. *Deschampsia antarctica* Desv. and *Colobanthus quitensis* Kunth. are the only native angiosperms growing in Antarctica, being restricted to Maritime Antarctica due to the longer daylight period, warmer temperatures and higher water availability in comparison to other parts of the Antarctic continent.

Skuas (*Catharacta* spp.) constitute a high and complex taxonomical group. At Antarctic Peninsula *Catharacta lonnbergi* and *Catharacta maccormicki* breed sympatrically, often constituting mixed pairs with fertile hybrids [3-5]. It is the most abundant flying bird at Admiralty Bay, King George Island, distributed in almost all ice-free areas. The total numbers of breeding skuas increased by 349 pairs (293%) from 1978/1979 to 2004/2005. It appears to be driven primarily by a tenfold increase in *C. maccormicki* pairs as well as a 95% increase in mixed pairs. In contrast, *C. lonnbergi* pairs have declined by

40% during this same time period [6].

Skuas nests are located always on a flat area, made on a variety of substrates, the most usual being mosses and lichens, which is torn out and pressed down to form a scoop. One or several scoops can be made [7]. The nests are mostly found on habitats characterized by abundant cover of the “moss-turf association”. At Cierva Point, Antarctic Peninsula, the main nest components were *Polytrichum alpestre* Hoppe (= *Polytrichastrum juniperinum* Hedw.) and *Deschampsia antarctica* Desv though many mosses and lichens are found [8]. Therefore the plant species that compose the Skuas nests will be determined by the characteristics of the local habitat. In this context, the objective of the present study is to describe plant composition of Skuas nests at Hennequin Point, King George Island, Antarctica.

In this study 61 activity nests were evaluated (Figure 1). They were located on mosses fields, rocks outcrops or, in some cases, on thawing channels.

2. Materials and Methods

During 2010/11 austral summer, a detailed mapping and characterization of plant composition of Skuas nests was carried out on Hennequin Point, eastern coast of Admiralty Bay, King George Island. The studied site comprises approximately 3.06 km² of ice-free area, composed

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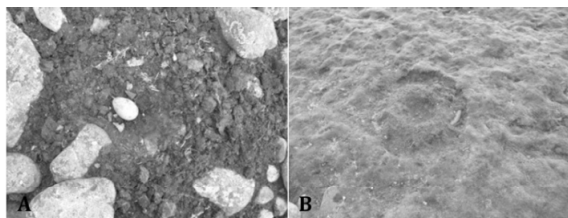


Figure 1. Example of Skuas nests sampled in Hennequin Point, admiralty bay, King George Island. (A) Active nest, with eggs; (B) Inactive nest, without eggs.

by the leithic basalt andsiltes and volcanic tuffs, with a NE-SO axis of 3.6 km, and less than 1 km wide. The relief ranges from 0 to more than 300 m above sea level.

Skuas nests bowls were mapped in the field using a Garmin 76CSX navigation GPS (Global Positioning System), which is able to obtain a metric precision, using the single point positioning method [9], without posterior processing. The point sampled were transferred to the TrackMaker[®] software and the resulting map was converted to the Drawing Interchange Format (.dxf). The points were overlapped with a base map proposed by [10], with help of Auto Cad software.

Skuas species were not differentiated because its classification is complicated due to morphological similarity, presence of mixed pairs, and hybridization. The descrip-

tion and classification of the plant communities were based on the usual literature [2,11,12]. The identification of bryophytes was done based on the main floras for Antarctica [1,12-14]. The plant species samples were included in the Antarctic Flora Collection of Federal University of Pampa Herbaria (HBI). The number of species sampled at each nest was tested for the statistical significance based in the One Sample T-test run in the Statistix 8 software.

3. Results

Were evaluated (61) nests, located on mosses field, rocks outcrops or, in some cases, on thawing channels. None comparative samples an analysis could been made with our nests with those sampled by [15], such these authors not show a GPS georeference about that Skuas nests found. Therefore overlapping the map images provide by these authors and that made in the presented study its possible estimates the nests occurrence in each grid, at 100×100 meters (10.000 m^2) for both maps, in a total of $6.8 \text{ nests} \cdot \text{ha}^{-1}$ sampled in 2010/2011 (**Figure 2**) against $5.4 \text{ nests} \cdot \text{ha}^{-1}$ sampled 2004/2005.

On average 4, 2 plant species were found in each nest. In a single nest were observed eight species, the highest diversity found in the samples. Ten nests were found

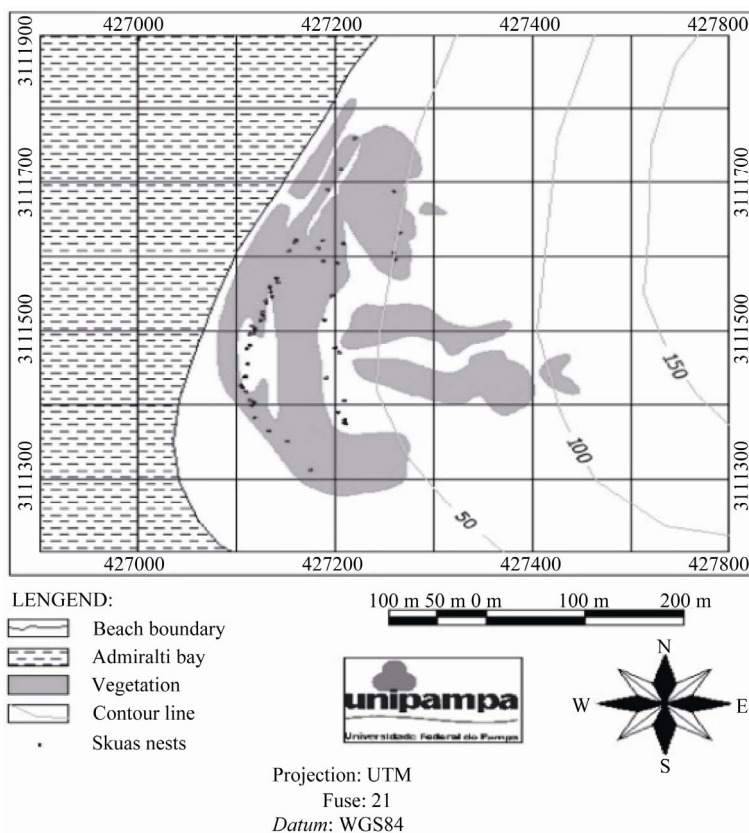


Figure 2. Skuas nest map distribution in the Hennequin Point, Admiralty Bay, King George Island.

composed only by two species and a single nest a lone species was found (Figure 3). The mosses *Sanionia uncinata* (Hedw.) Loeske, *Polytrichastrum alpinum* (Hedw.) G. L. Smith *Syntrichia magellanica* (Mont.) R. H. Zander are the most frequent plant found in the Skua nests, followed by the antarctic grass *Deschampsia Antarctica* and for the terrestrial algae *Prasiola crispa* Lightfoot. For lichenized fungi the fruticulous lichen *Usnea antarctica* Du Rietz was the most representative species, followed

by *Spherophorus globosus* (Huds.) Vain. Others moss species as *Andreaea gainii* Card., *Bartramia patens* Brid., *Syntrichia filaris* (Mül. Hal.) R. H. Zander and *Chorisodontium aciphyllum* (Hook f. Wilson) Broth and the lichen species *Ochrolechia frigida* (Sw.) Lyngae, *Parmelia saxatilis* (L.) Ach., *Pannaria hookeri* (Borrer) Nyl., *Stereocaulon glabrum* (Müll. Arg.) Vain and *Usnea aurantiacoatra* (Jacq.) Bory are the less frequent species in the nests sampled (Figure 4).

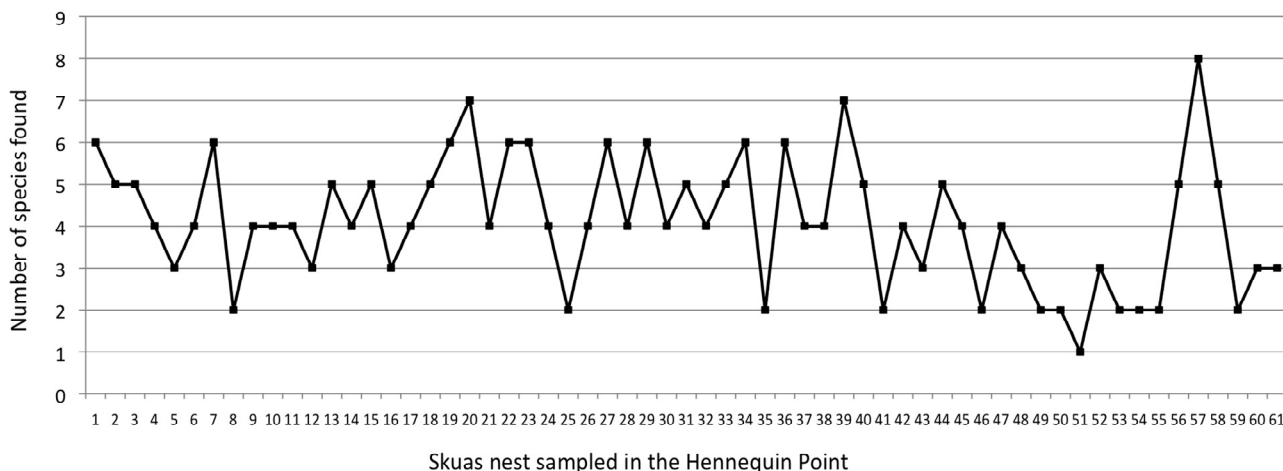


Figure 3. Number of plant species per nests sampled at Hennequin Point, Admiralty Bay, King George Island. (p = 0.0472; Standart Desviation = 1.53).

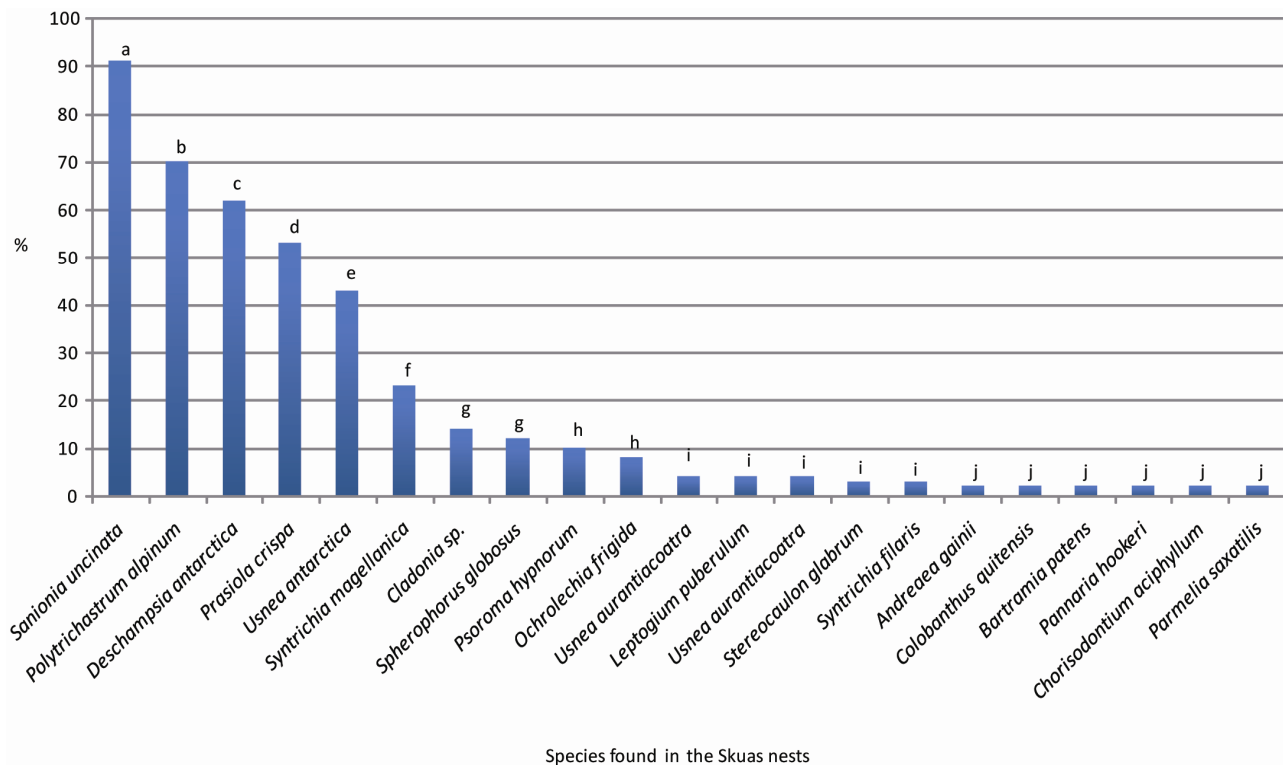


Figure 4. Number of occurrences in per cent of each plants and lichen species sampled in the Skuas nests at Hennequin Point, Admiralty Bay, King George Island. (The same letters do not differs at the significance level p = 0.05).

4. Discussion

The global changes and consequent changes in Antarctic environment are a central point of recent studies. Some had reported the effect of climate changes on Antarctic and Sub-Antarctic species especially the increase in the predatory seabirds' populations. In Hennequin Point it was observed an increase of Skua pairs [15] what can be related to local glacial retraction [16,17]. The effect of this retraction was also studied in plant populations. There was an increase of the area where mosses and associated species, such as lichen, flowering plants and algae could colonize [2,18-20].

The main mosses found in the nests, occurs typically in plant communities at Admiralty Bay area [19], such *Sanionia uncinata* (Hedw.) Loeske and *Polytrichastrum alpinum* (Hedw.) G. S. Smith often occurring associated with a lichen species as *Cladonia borealis* S. Stenroos, *Usnea antarctica* Du Rietz, *Leptogium* sp. This species is considered the most abundant lichen associated to moss species, occurring together with others fruticolous species [18]. Furthermore, this species constitute the most visible talus when compared to other types such as crustosetallus. The occurrence of small lichen species in the nests could be because they were accidentally carried to the nest with mosses caught by Skuas.

Considering these sea bird species is the most abundant flying bird in Admiralty Bay, with 338 recorded nest sand at a density of 19.70 nests·km⁻², distributed in almost all ice-free areas [16]. During the breeding season of 1978/79 [3], a total of 50 nests were found occupying a density of 2.91 nests·km⁻². Data comparison suggests an increase by 576% in the species population. The plant communities sizes were also change in some sites of Antarctica using by sea birds in the breeding season [2,18, 19], suggesting a closed relationship of the birds populations and the plant species.

Are observed an increasement of Skuas nests in Hennequin Point beach when compared with other bird evaluation in this area [15]. However, its not possible to test the significancy of these changes, such the comparison methods used does not applies for these proposes. The number of Skuas nests in the study area increase from 5.4 nest·sha⁻¹ (2004/2005) to 6.8 nest·sha⁻¹ (2010/2011). It also observed an side-by-side occurrences of birds nests, being the higher density found at the plateau close to beach (**Figure 2**) where the most plants communities biomass are also established.

Two of the tree main plant species found at the nests were also registered in a similar approach at Antarctic Peninsula [8], such *Polytrichastrum alpinum* and *Deschampsia antarctica*. Taking into consideration that the dominance of species can vary among different places at Antarctica, there might be a certain selection of those

species. Among other variables, nests characteristics can be important to Skuas reproductive success [5,21-24]. Taking it into consideration it is important to continue researches in order to evaluate if different nests components could influence Skuas reproductive success.

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