OCCURRENCE AND MORTALITY OF ANTARCTIC AND SUB-ANTARCTIC SEABIRDS ALONG THE SOUTHERN BRAZILIAN COAST

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Abstract: *Antarctic and sub-Antarctic seabirds are widely distributed and have a large migratory movement, usually using the South Atlantic region as a resting and foraging area. The aim of this study is to quantify the mortality of Antarctic and sub-Antarctic seabirds along the Brazilian Southern Coast and compare this data between two periods with an interval of eleven years. The census was conducted between Balneário Pinhal and Mostardas, Rio Grande do Sul State. A total of 1183 carcasses were recorded in the two years of study: 1087 during the first year (1997-1998) and 96 in the second (2008-2009). 15 species were identified: Diomedidae (n = 4) and Procellariidae (n = 11). The mortality of Antarctic and sub-Antarctic seabirds on the Southern Brazilian Coast can be a consequence of several factors: anthropogenic and climate phenomena. After eleven years, the significant decrease in the number of individuals indicate efficient mitigation measures contributing to a reduction in mortality of species of seabirds in the South coast of Brazil.*

Keywords: Marine Birds, Procellariiformes, Rio Grande do Sul, Carcasses

Introduction

Important components of the marine ecosystem, seabirds are widely distributed and have large migratory movements (Péron *et al.*, 2010). Some species are recorded using the South Atlantic region as a resting and foraging area. Antarctic and sub-Antarctic birds are observed in the region of Southern Brazil, mainly during the non-breeding period, because the region has high primary productivity. The confluence of two large ocean currents, Brazil Current and Malvinas Current, provides large productivity in this area, increasing the food resource for these species (Borzone *et al.*, 1999; Fernandes & Brandini, 1999).

In the Southern Brazilian ocean, however, some threats caused by human activities and climatic phenomena can affect seabirds, resulting in mass mortality of these species (Petry & Fonseca, 2002; Costa *et al.*, 2011). For example, overexploitation of fishery in the region can interfere in the

mortality rate of these seabirds (Cury *et al.*, 2008; Petry *et al.*, 2012). Therefore, the aim of this study is to quantify the mortality of Antarctic and sub-Antarctic seabirds along the Brazilian Southern Coast and compare this data between two periods with an interval of eleven years.

Materials and Methods

The censuses were conducted between Balneário Pinhal (30° 14' 55.0" S, 50° 13' 47.8" W) and Mostardas (31° 10' 52.1" S, 50° 50' 03" W), located in the mid coastal area of the State of Rio Grande do Sul, Brazil, from July 1997 to June 1998. A second survey was carried out eleven years later, from July 2008 to June 2009. A transect of 120 km was covered monthly and all the seabird species were identified and recorded per kilometer. The species had their frequency of occurrence FO = (NMO * 100) / NTM calculated, where

NMO = number of months in which the species were observed and NTM = total number of months of sampling.

Results

A total of 1183 individuals were found dead in the two years of study: 1087 in the first year followed by 96 in the second year. 15 species were recorded: Diomedidae (n = 4) and Procellariidae (n = 11). The most frequent species in the first sampling were *Procellaria aequinoctialis* (FO = 92.30%), *Thalassarche melanophrys* (FO = 84.61%) and *Puffinus gravis* (FO = 76.92%). The species with lower frequency were: *T. chrysostoma*, *Pachyptila belcheri* and *P. desolata* (FO = 7.69%). In the second year, the most frequent species were *Thalassarche chlororhynchos*, *Puffinus gravis* (FO = 61.54%) and *Procellaria aequinoctialis* (FO = 38.46%). (Figures 1 and 2). Seven species were not recorded in the second year: *Diomedea epomophora*, *Thalassarche chrysostoma*, *Fulmarus glacialis*, *Pterodroma incerta*, *Pachyptila belcheri*, *Pachyptila desolata* and *Puffinus griseus* (FO = 0%).

Discussion and Conclusion

Different Antarctic and Sub-Antarctic species were observed along the Southern Brazilian Coast. Some

data about the mortality of some species like penguins, albatrosses and petrels had been recorded in this area (Petry & Fonseca 2002; Petry *et al.*, 2012). The mortality of these seabirds recorded during the sampling can occur due to several factors: fishing activity, ocean pollution by oils and synthetic materials or climatic origin (Petry & Fonseca, 2002). The fishing activity contributes to seabird mortality through collision with trawlers (Watkins *et al.*, 2008). The ingestion of the oil occurs when the individuals try to clean their feathers and the synthetic materials in the ocean can be ingested by seabirds because they confuse them with food (Burger, 1993; Petry *et al.*, 2009; Petry *et al.*, 2010). Climate phenomena, such as El Niño, can cause the death of many individuals of seabirds species, switching their food resources (Pierotti & Annett, 1990).

Comparing the years of survey, the number of dead individuals along the Brazilian Southern Coast decreased during the eleven year interval. The National Action Plan for the Conservation of Albatrosses and Petrels drawn up between the two years of study proposed several mitigation measures to reduce the mortality of these species, such as use of tori line and night setting (Neves, 2006). After eleven years, the field records indicated mitigating measures were indeed effective, showing a decrease of seabird species mortality along Southern Brazilian coast.

Figure 1. Antarctic and sub-Antarctic seabirds recorded in Southern Brazil. Frequency of occurrence of these species on the coast of Rio Grande do Sul. The red and pink colored bars indicate, respectively, the two years of sampling.

Figure 2. The most frequent species found dead along the Southern Brazilian coast were (a) *Procellaria aequinoctialis* and (b) *Thalassarche melanophrys* recorded with processed plastic around their necks, (c) *Thalassarche chlororhynchos* and (d) *Puffinus gravis* both individuals with oil stains. Photos: Victória Renata Fontoura Benemann (a, b, c) and Angelo Luís Scherer (d).

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