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# Microplastics and their interaction with zooplankton: a gateway to aquatic food webs in Antarctica?

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## Abstract

Plastic pollution in aquatic ecosystems causes enormous concern due to its rapid dispersion and persistence in the environment. The Antarctic system does not escape this worldwide problem, as macro and microplastics have already been detected in marine-coastal aquatic systems, posing a significant threat to this environment and its fragile fauna. However, the sources and magnitude of this threat in the Antarctic continent are far from being understood, and the generation of basal information has been identified as a priority. This study aims to evaluate the environmental densities of microplastics (MPs) and the ingestion and survival of Antarctic limnic and marine species experimentally exposed to irregular MPs in different conditions (e.g. concentrations, presence of biofilm, natural food). Surface marine water samples were taken in Collins Bay between 2019 and 2022 with a Manta net (220 microns) in front of the Uruguayan Antarctic Base, while limnic water samples were taken only in 2022. Shape, colour, size and density of MPs were analyzed with a stereomicroscope with polarized light, and the polymeric composition with a micro-FTIR. MPs were detected in all marine samples, with densities between 0.1 and 1.7 items.m<sup>3</sup>. The most common polymers were polyethylene, polypropylene, polyamide and rayon. Fibers were always more abundant than fragments (79%-17%) except in one sample of 2019 (37%-60%). *Branchinecta gaini*, *Boeckella poppei* and *Salpa thompsoni* were the model organisms used, limnic and marine, respectively. Organisms were obtained from two lakes and Collins Bay, all located in the Fildes Peninsula (King George Island, 62° 11'4"S; 58° 51'7"W). Preliminary data confirmed the ingestion of MPs by *B. gaini*, and low mortality was observed in the MPs concentrations tested (0,01 y 0,1 g/l). Our results provide basal information that contributes directly to the objectives and challenges of the Antarctic Treaty System.

**Keywords:** Antarctica, Microplastics, Plankton

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