
MARINE DEBRIS REACH ANTARCTIC SEALS: FIBERS ARE THE MAIN INGESTED MICROPLASTIC

Julieta Cebuhar*^{†1,2}, Lucas Rodriguez Pirani³, Lorena Picone³, Javier Negrete⁴, Maira Proietti⁵, Rosana Romano³, Carlos Della Védova³, Eduardo Secchi⁶, and Silvina Botta⁶

¹Laboratorio de Ecologia e Conservação da Megafauna Marinha- ECOMEGA – Av. Ialia s/n Km 8, Carreiros, Rio Grande, RS, Brazil

²Programa de Pós-graduação em Oceanografia Biológica- Instituto de Oceanografia, FURG – Av. Ialia s/n Km 8, Carreiros, Rio Grande, RS, Brazil

³CEQUINOR – Departamento de Química, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Blvd. 120 N° 1465, La Plata, Argentina

⁴INSTITUTO ANTARTICO ARGENTINO – Av. 25 de Mayo 1147, Villa Lynch, Provincia de Buenos Aires, Argentina

⁵Laboratorio de Ecologia Molecular Marinha – Av. Ialia s/n Km 8, Carreiros, Rio Grande, RS, Brazil

⁶Laboratorio de Ecologia e Conservação da Megafauna Marinha- ECOMEGA – Av. Ialia s/n Km 8, Carreiros, Rio Grande, RS, Brazil

Abstract

Contamination in the Antarctic ecosystem and biota has been reported since the 1990s, and concentrations of anthropogenic debris, including macro and microplastics, are increasing in this region. The interaction between fauna and microplastics has been described from crustaceans to penguins, but contamination in seals is still unknown. Here, we assessed microplastic contamination in three species of Antarctic seals from the Western Antarctic Peninsula (WAP) by analyzing 29 fecal samples of *Lobodon carcinophaga* (n=5), *Leptonychotes weddellii* (n=11) and *Hydrurga leptonyx* (n=13) collected at Cierva Cove. Feces were sieved successively through four different sieve sizes (1, 0.5 mm, 500 and 300 μm) and digested with KOH 10%. Samples were then evaluated with a binocular microscope and potential microplastics were isolated. Procedural blanks (n=3) for each sample were used throughout the entire process. Micro-RAMAN and Micro-FTIR spectroscopies were used to assess polymeric composition. Debris were present in all samples. The number of debris per sample, per species was 12.4, 14 and 15.8 for leopard, Weddell and crabeater seals, respectively. The main particles found were fibers (n=237), fragments (n=130) and filaments (n=28), with sizes ranging from 0.02 to 40mm; black, blue and white were the dominant colors, however other colors were also found. The RAMAN and Micro-FTIR spectra of 20% of samples up to now revealed black carbon, blue and green copper phthalocyanine pigments, semi-synthetic cellulose fibers and a polypropylene filament. This is the first evidence of anthropogenic litter in scat samples of Antarctic seals, and the first evidence of black carbon in Antarctic biota. Despite the low number of ingested plastics, detection in 100% of the samples of these top predators alerts to the potential impacts of these contaminants in this remote region.

*Speaker

†Corresponding author: jucebuhar@gmail.com

Keywords: Antarctica, black carbon, fibers, phocids, RAMAN