MICROPLASTICS AND ORGANIC PERSISTENT CONTAMINANTS IN ODONTOCETE SPECIES: EVIDENT EXPOSURE, BUT NOT CORRELATED.

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INTRODUCTION

Plastics materials incorporate a number of chemical compounds added to improve their performance such as plasticizers, antioxidants, flame-retardants, light and heat stabilizers, that, in some cases, make up a large proportion of the plastic product itself (Hahladakis et al., 2018; Rochman, 2015). These additives may interact biochemically and cause toxic effects, and therefore may have an impact on marine organisms and habitats (Hammer et al., 2012).

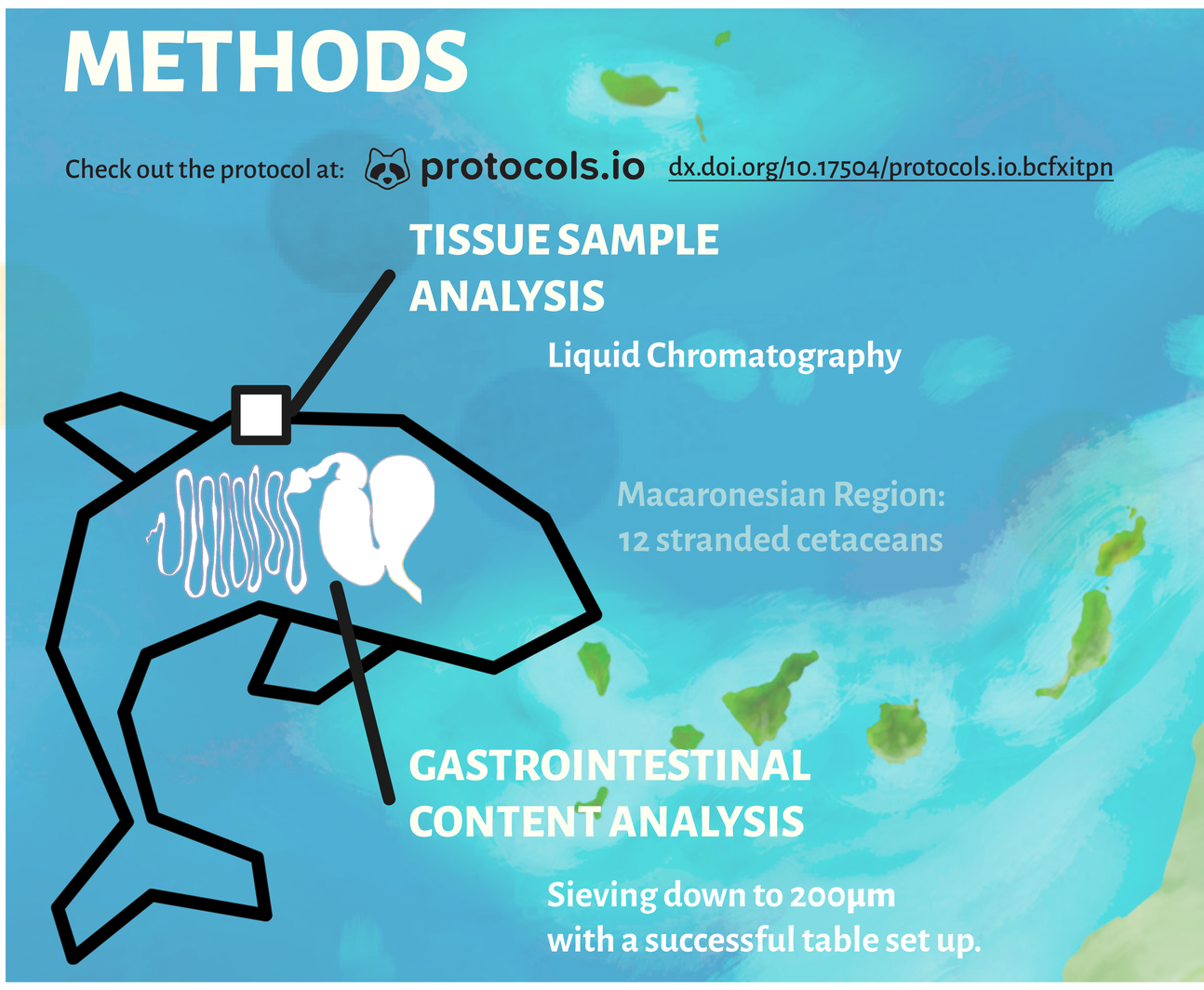
This study investigates:

(1) the level of plastic ingestion in stranded cetaceans (with a especial focus on microplastics, sieving the gastrointestinal contents down to 200 µm).

(2) the concentrations of organic persistent contaminants (OPCs) in the skeletal muscle of the same cetaceans.

METHODS

Check out the protocol at: protocols.io dx.doi.org/10.17504/protocols.io.bcfxitpn



RESULTS

ZERO MACRODEBRIS was found, except for 2 plastic labels.

All animals contained MICROPLASTICS, mostly FIBRES (98%).

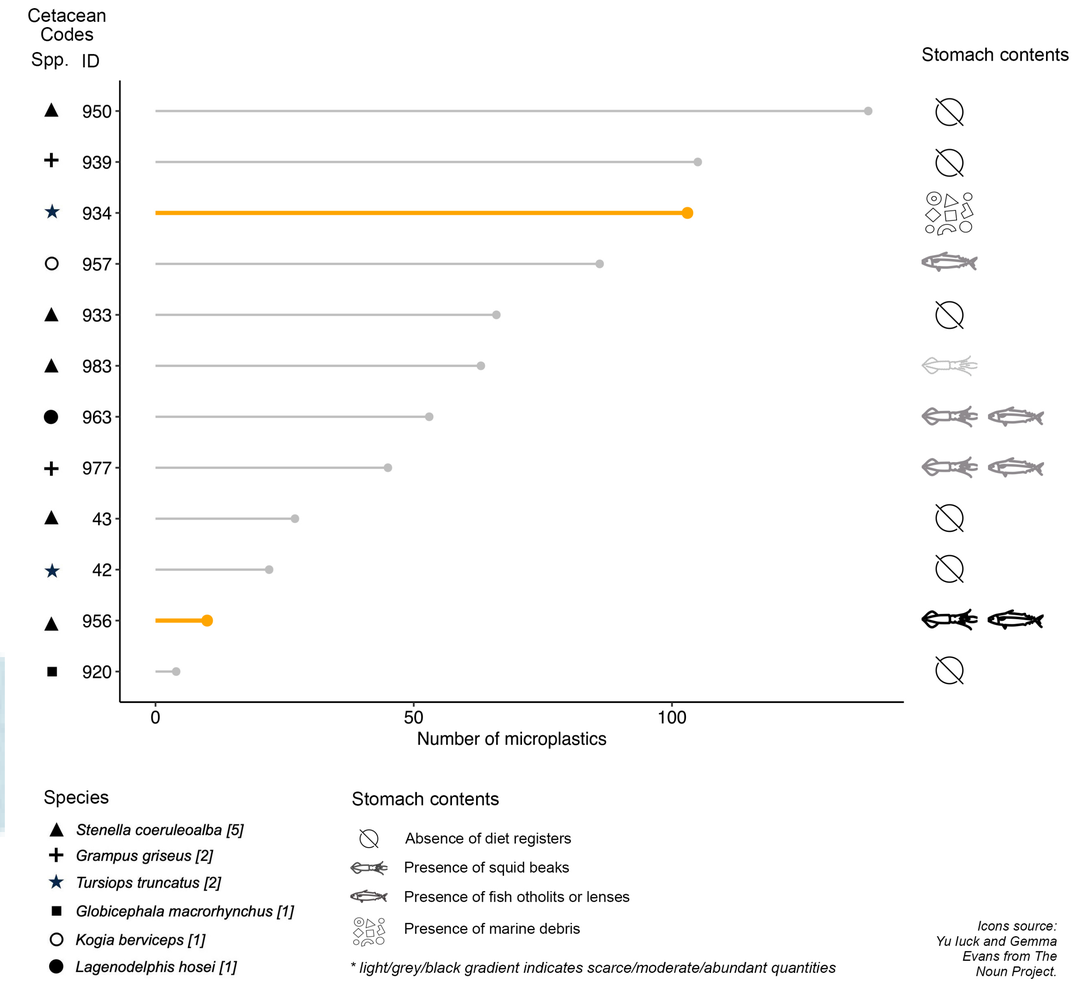


Fig. 1. Relationship between stomach contents analysed for dietary records and the study of microplastic abundance. Cet 934 was the only animal with macroplastics in its stomach contents, which corresponds to a high record of microplastics. It is also noted that the animal that contained the most prey remains in its stomach (Cet ID = 956) had the second lowest microplastic concentrations.

BISPHENOLS: present in 94% of samples.
PHTHALATES: predominantly DEHP (88% of samples).
PESTICIDES: high levels of DDD (max. 1620 ng/g).

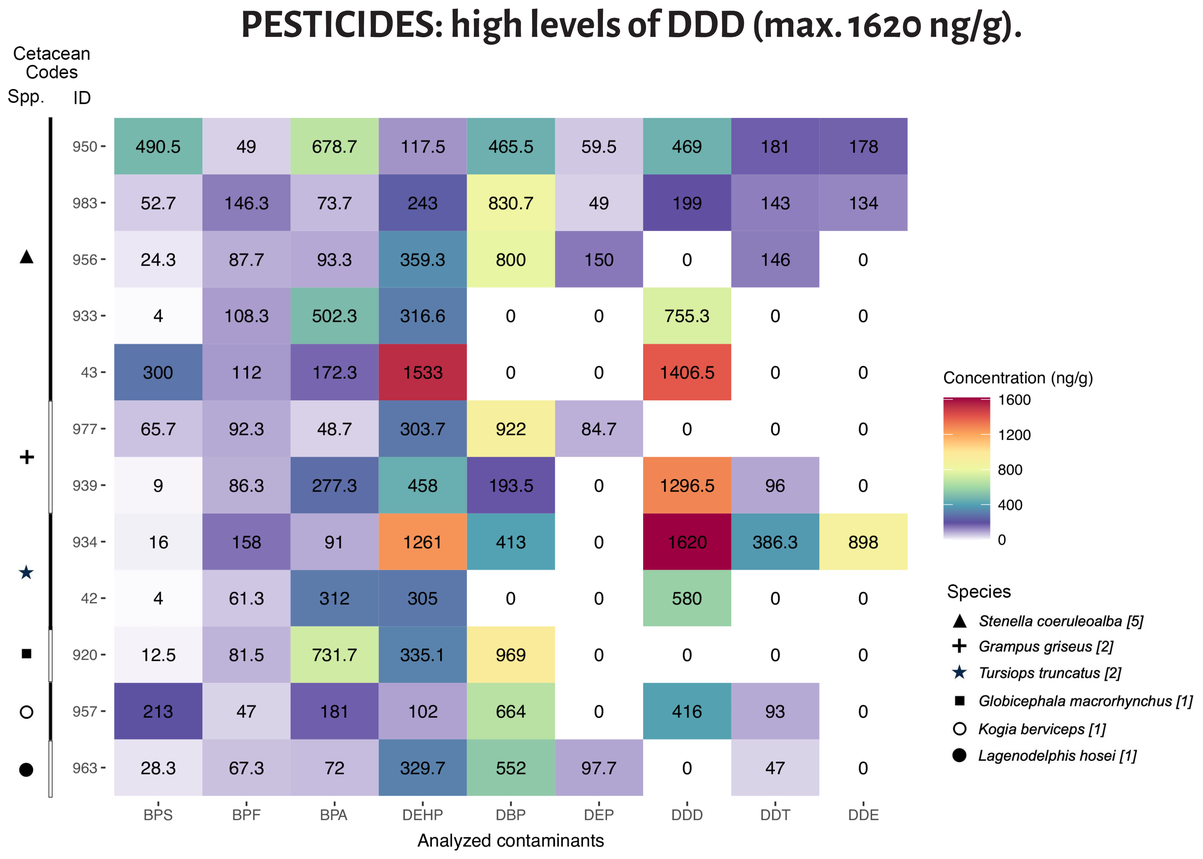


Fig. 2. Heatmap of the concentrations of the different organic persistent contaminants analysed: bisphenol S (BPS), bisphenol F (BPF) and bisphenol A (BPA), di (2-ethylhexyl) phthalate (DEHP), dibutylphthalate (DBP) and diethylphthalate (DEP), dichrolophenyl dichloroethane (DDD), dichlorodiphenyl dichlorethylene (DDE) and dichlorodiphenyl trichloroethane (DDT).

CONCLUSIONS

- Findings show evidence of exposure of cetaceans to both plastic fibres and OPCs.
- Microplastic fibres were present in numbers too low to block or compromise the functioning of the digestive tract.
- The highest OPCs concentrations were found in three dolphins that exceeded the value of 1 ppm for DDD, a toxic threshold for organohalogenated compounds in marine mammals' tissues.
- No correlation was found between microplastic concentrations and tissue OPCs levels.

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