Microplastics in gills and gastrointestinal tract of Antarctic fish

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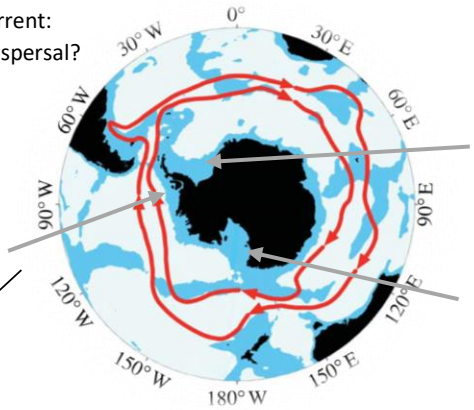
INTRODUCTION – Microplastics (MP) in a remote location, the Southern Ocean (SO)[1]

Antarctic Circumpolar Current: barrier to MP southern dispersal?

MP in



fish = ?

surface water[2] =

sediments[3] =

Source: modified from Thompson A.F., 2008. Phil Trans A Math Phys Eng Sci.

OBJECTIVES

This study investigates the occurrence of MP in Antarctic fish.

RQ1: Are there MP in Antarctic fish species?

RQ2: Is there a difference in MP concentration between the three Antarctic fish species?

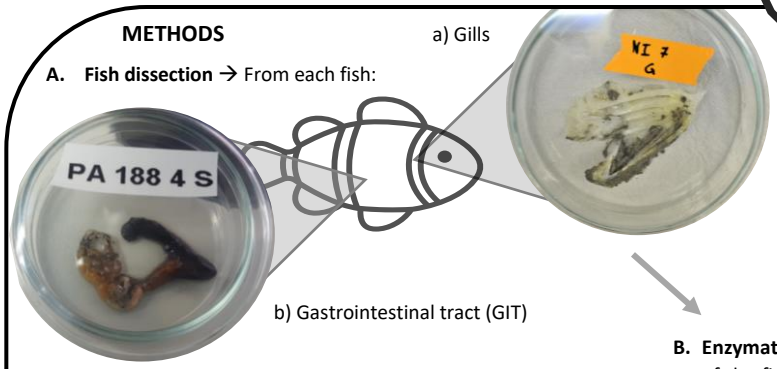
RQ3: Does the occurrence of MP differ between internal (GIT) and external (gills) tissues?

RQ4: What type of MP are found in Antarctic fish?

METHODS

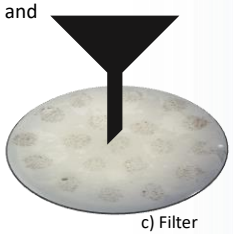
A. Fish dissection → From each fish:

a) Gills



b) Gastrointestinal tract (GIT)

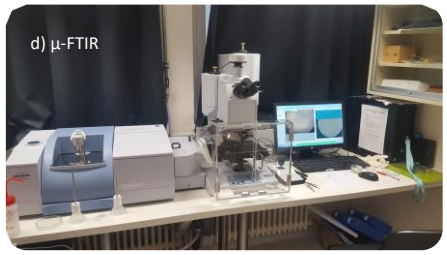
B. Enzymatic digestion[4] of the fish organs and **fractioning**



c) Filter

C. MP analysis

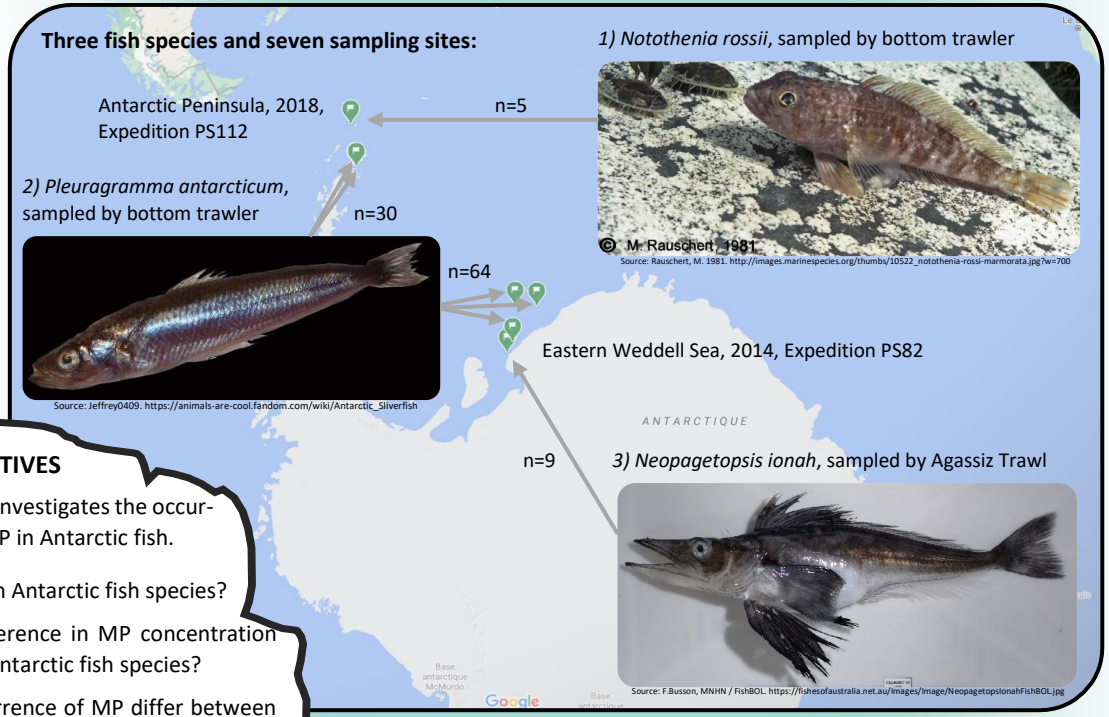
- **MP >500µm:** ATR-FTIR (Bruker Optics GmbH, model alpha)
- **MP <500µm (sub-sample):** Hyperion 2000 FTIR (Bruker, Billerica, MA, USA)
- siMPle software: polymer reference database, 1st deviation, vector normalization, reliability threshold: 70%[5]



D. Procedural blanks and strict contamination controls[6]

Illustrations: a), b), c) and d) Lea Masserey, 2020

Three fish species and seven sampling sites:



1) Notothenia rossii, sampled by bottom trawler

© M. Rauschert, 1981

Source: Rauschert, M. 1981. http://images.marinespecies.org/thumbs/10522_notothenia-rossi-marmorata.jpg?w=700

Source: Jeffrey0409. https://animals-are-cool.fandom.com/wiki/Antarctic_Sliverfish

Source: F.Busson, MNHN / FishBOL. https://fishesofaustralia.net.au/images/image/NeopagetopsIonahFishBOL.jpg

PRELIMINARY RESULTS

>500µm fraction:

	P. antarcticum	*N. ionah*	*N. rossii*
GIT	0	0	0
Gills	1 PA line (>10mm)	0	0

Illustration: PA line. Source: Lea Masserey, 2020.

But was the **PA macroplastic** trapped in gills during fishing and comes from the net?

<500µm fraction:

	P. antarcticum	*N. ionah*	*N. rossii*
GIT	Analysis in progress		
Gills			

➔ So far, **a macroplastic** but **no MP particles >500µm** were found in the GIT and gills of the studied fish.

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References:

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[6]Hermsen, E. et al., 2018. Environ. Sci. Technol. 52, 10230–10240.