

MICROPLASTICS IN THE ADRIATIC SEA – DEPENDENCE ON ORGANISM SPECIES, TISSUE AND HABITAT TYPE

Vlatka Filipović Marijić¹, Martina Ugrinović¹, Fabio Faraguna², Dajana Kučić Grgić², Marija Kuštro², Candice Magnouloux³, Sara Zrinić², Helena Stipetić², Damir Valić¹



¹Ruđer Bošković Institute, Division for Marine and Environmental Research, Zagreb, Croatia

²University of Zagreb Faculty of Chemical Engineering and Technology, Zagreb, Croatia

³Catholic University of Lyon, 10 place des Archives 69002 Lyon, France



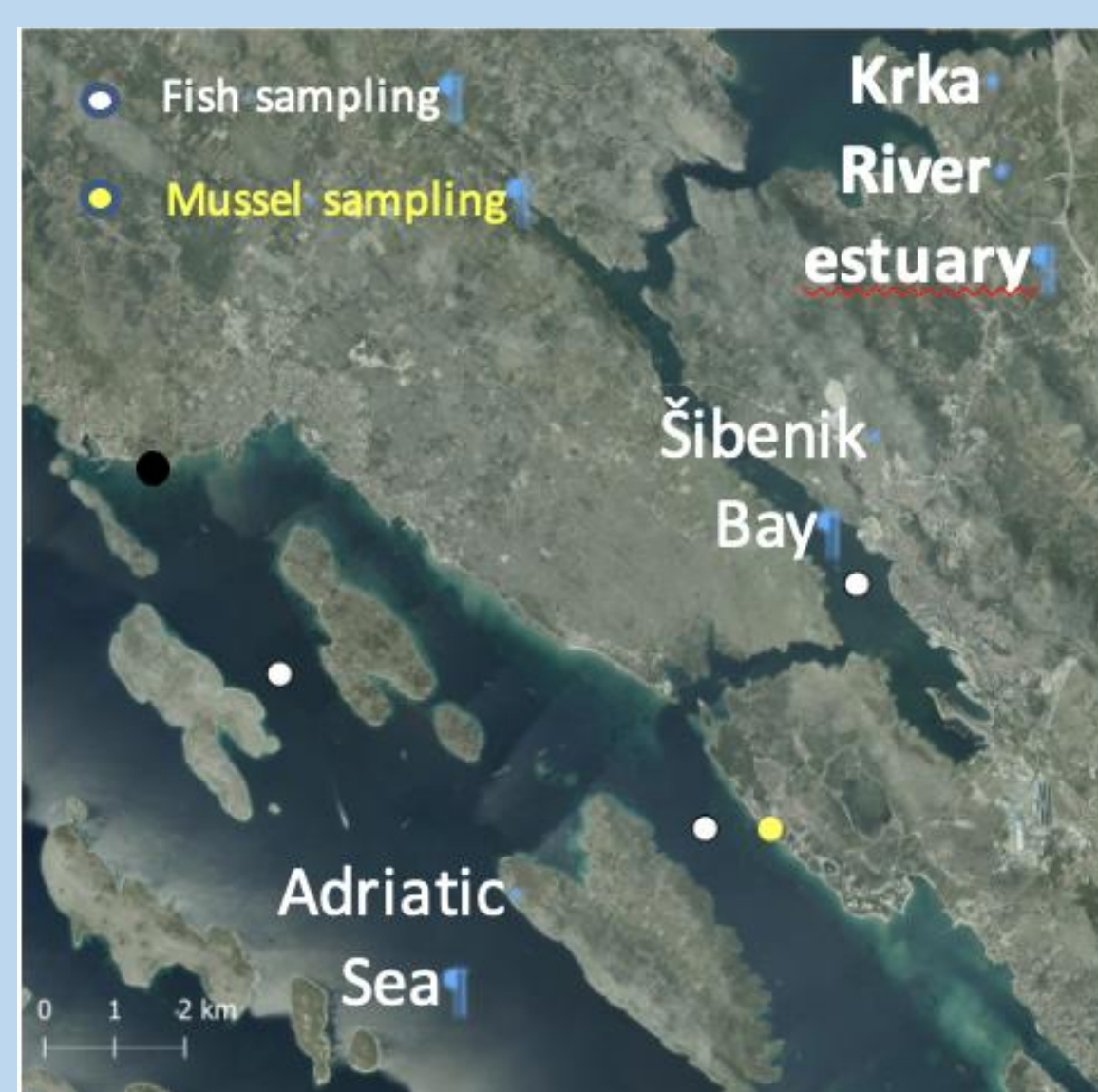
INTRODUCTION

- Microplastics (MPs) are pervasive and due to their small dimensions (<5 mm) may be ingested by different aquatic organisms, causing physiological damage
- Data on the presence of MPs in different tissues of fish and bivalves in the Adriatic Sea are still rare, and depend on the tissue type, species and their habitat

GOALS

- Comparison of occurrence, abundance and types of MP in fish (gilthead seabream, *Sparus aurata*) and bivalves (mussels, *Mytilus galloprovincialis*) from the Šibenik Bay
- Estimation of the dependence of MP occurrence and types on organism (free living and sedentary), tissue (digestive tract and gills) and habitat types (wild and farmed)

SAMPLING AREA



- gilthead seabream
- mussels

MATERIALS AND METHODS

BIOINDICATOR ORGANISMS

gilthead seabream
(*Sparus aurata*)



intestine
gills

mussels
(*Mytilus galloprovincialis*)



digestive gland
gills

TISSUE DIGESTION by 10% KOH at 40 °C
for 48 hours in the ultrasonic bath

VACUUM FILTRATION
over gold-coated
polyester filters with a
pore size of 0.8 µm



IRTracer-100, AIM-9000,
Shimadzu

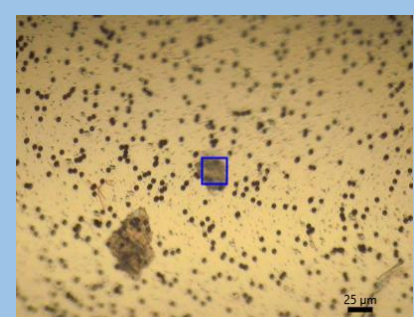
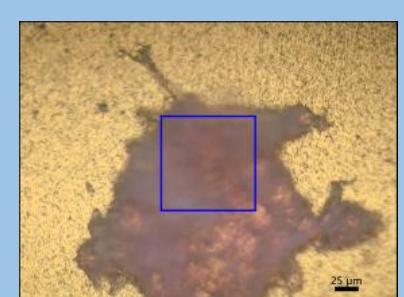
The procedure involved work in a protective cabinet and usage of glass consumables to prevent contamination, and application of a "blank sample" to check the accuracy of the work.

RESULTS

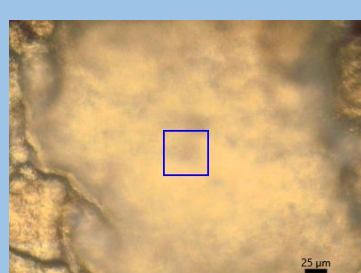
GILTHEAD SEABREAM



intestine



gills



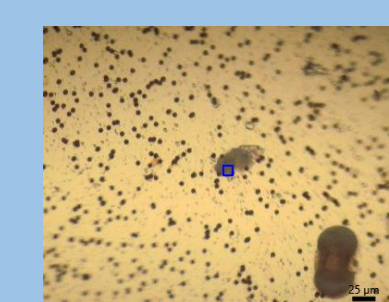
- poly(ethylene-co-acrylic acid)
- polyethylene
- nylon

- polypropylene

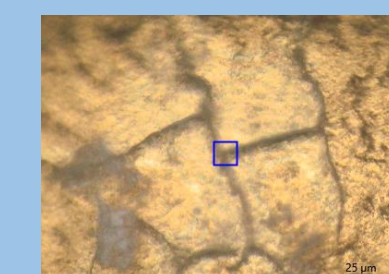
MUSSELS



digestive gland



gills



- poly(ethylene-co-acrylic acid)
- poly(ethylene-co-vinyl acetate)
- polyethylene
- nylon

- nylon
- polystyrene

Tissue with the highest occurrence of different MP types was digestive tract in both organisms – dietary exposure

Slightly higher occurrence of MP was found in farmed than wild individuals of fish and bivalves (5-15%)

More MP types and slightly higher abundance was found in sedentary than free living organisms

The majority of isolated particles were of non-plastic origin (75-82%), followed by natural (17-20%, mostly cellulose) and synthetic polymers (1-5%)

CONCLUSIONS

- Presented results indicated occurrence of MPs in organisms from the Adriatic Sea, slightly higher in sedentary than free living
- Aquaculture was shown as potential source of MP in the aquatic ecosystem and dietary route as important MP uptake site
- Evident exposure to MPs in the Adriatic Sea highlighted the importance of further research on MP exposure, accumulation, and potential biological effects to develop strategies for the protection of aquatic ecosystems, but also human health