

Dario Giani¹, Cristina Panti,¹ Matteo Bains¹, Matteo Galli¹, Margherita Concato¹, Maria Cristian Fossi¹

¹Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy.

Corresponding author: dario.giani@unisi.it

Introduction

Plastic pollution in the ocean represent one of the biggest worldwide environmental topic, the distribution of plastic particles in the marine environment and in biota is the main issue of several studies (Lusher et al., 2015; Auta et al., 2017; Avio et al., 2020). Microplastics distributed along the water column with different patterns of accumulation. The monitoring of microplastics in the environment can lead to over or underestimation of the risk posed to marine species.

Materials and methods

Within the project AdriCleanFish, aimed to investigate the occurrence of plastics in the environment and the impacts on fish species, the data obtained from surface water sampling with manta trawl (mesh 0.3 mm) were compared with microplastics isolated from the gastrointestinal tract of 6 different fish species; 3 pelagic species (*Engraulis encrasicolus*, *Sardina pilchardus*, *Trachurus trachurus*) and 3 demersal species (*Merluccius merluccius*, *Mullus barbatus*, *Solea solea*) from two different sampling site in the Adriatic Sea (Chioggia and Civitanova Marche). The two types of sampling were carried out in the same area thanks to the collaboration with professional fishermen (Fig. 1).

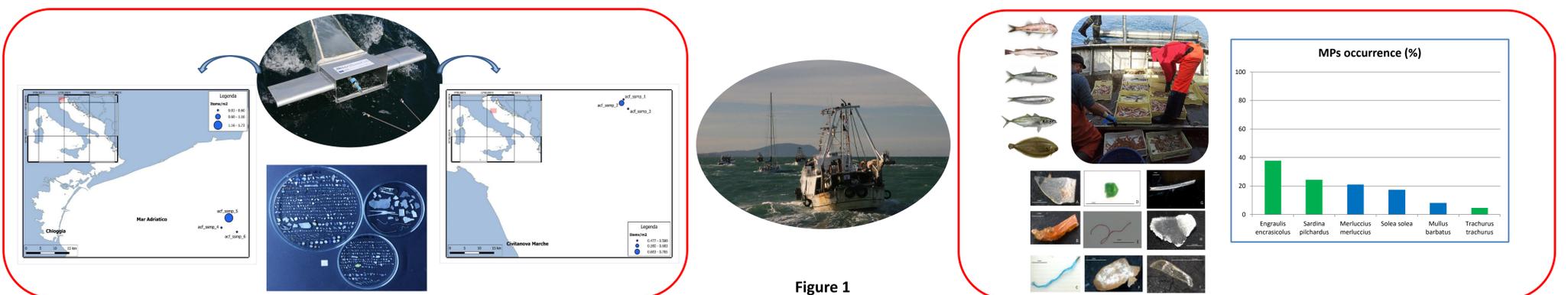
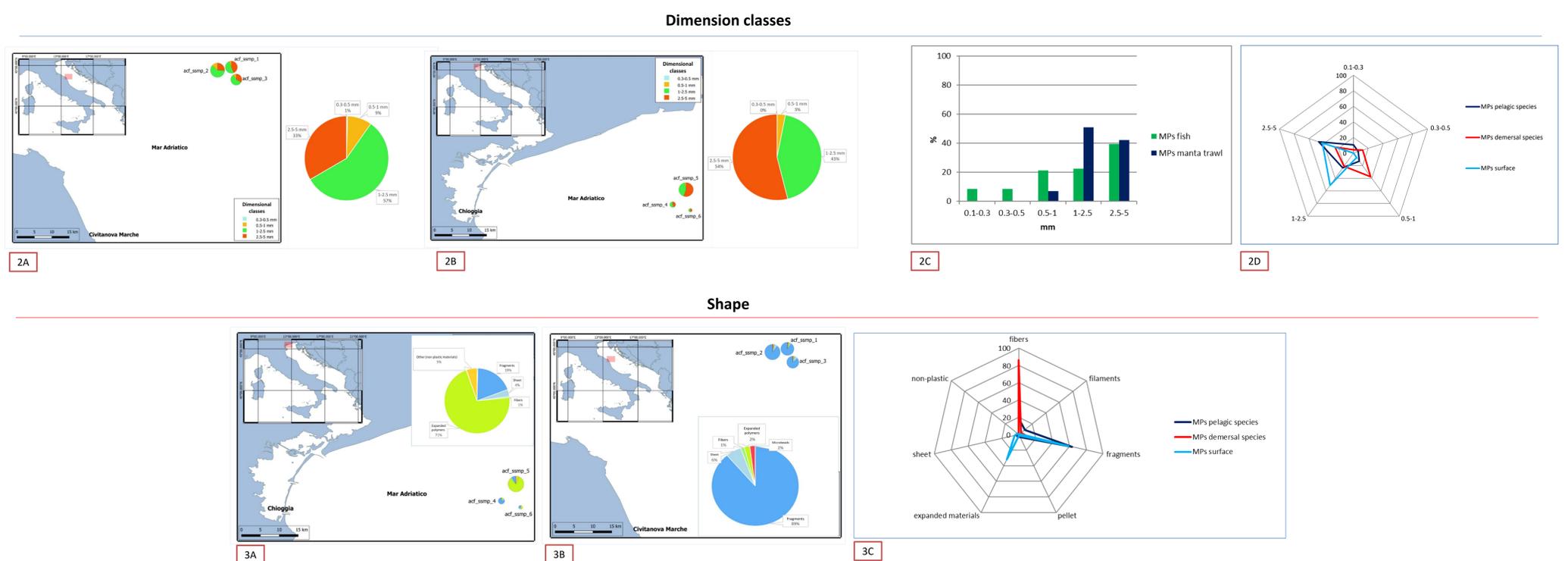


Figure 1

Results and discussion

The microplastics were sorted and characterized by size class and, comparing the manta samples with microplastics detected in fish species, the environmental microplastics with dimensions between 0.3 and 0.5 mm were not found in any surface water sample, while microplastics belonging to this size class was identified in fish species (Fig. 2A;2B;2C). It emerged that surface microplastics and particles isolated from pelagic species are similar in size, between 1 and 5 mm, while smaller microplastics were isolated mostly in demersal organisms (Fig. 2D). The isolation method used for fish species has also made it possible to investigate the abundance of microplastics less than 0.3 mm in size (limit of detection for surface sampling with manta trawl), which represent 8% of the microplastics ingested (Fig. 2C). The same comparison was made considering the different shapes of microplastics (Fig. 3A;3B;3C). Fibers are mostly found in demersal fish species (Fig. 3C); on the other hand they are the least frequently found with manta sampling (Fig. 3A;3B).



Conclusion

These differences underline the importance of the simultaneous sampling of fish species belonging to different habitats combined with sea surface sampling, as they can represent comprehensively the contamination of microplastics in the same study area and the related effect on marine organisms.

References

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