Microplastics in the bivalve *Mytilopsis leucophaeata* from a coastal urban lagoon (Rodrigo de Freitas Lagoon, Rio de Janeiro-Brazil)

Raquel A. F. Neves*, **Tâmara Bárbara Guimarães & Luciano N. Santos**

Graduate Program in Neotropical Biodiversity, Institute of Biosciences, Federal University of the State of Rio de Janeiro (UNIRIO), Rio de Janeiro, Brazil;
Research Group of Experimental and Applied Aquatic Ecology, UNIRIO, Brazil; e-mail address: raquel.neves@unirio.br

Introduction

False mussels (Dreissenidae) are among the most notable fresh- and brackish water invaders (**Rodrigues et al., 2022**).

The unintentionally introduced *Mytilopsis leucophaeata* (Conrad, 1831) in Rodrigo de Freitas Lagoon-RFL (**Rizzo et al., 2014**) is now the most abundant macrofaunal species, widely established and well distributed throughout the lagoon (**Rodrigues et al., 2021**).

Our study aimed to assess the potential use of this invasive filter-feeder as indicator of microplastics pollution in RFL.

Material and Methods

Agglomerates (~150 ind) were manually collected in ten stations distributed throughout lagoon (**Fig. 1**) and kept frozen.

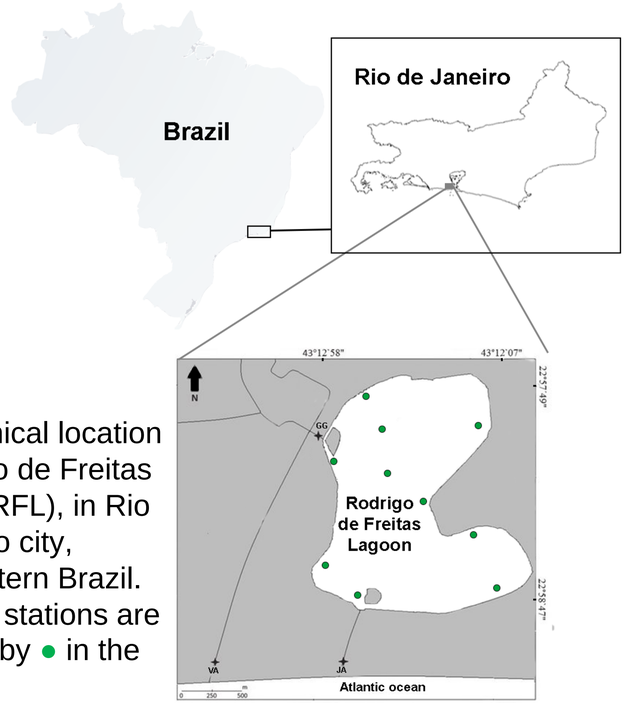

Figure 1. Geographical location of Rodrigo de Freitas Lagoon (RFL), in Rio de Janeiro city, Southeastern Brazil. Sampling stations are indicated by ● in the map.

In the laboratory, 60 individuals were sorted by station for soft-tissues digestion. Each pool of 10 soft-tissue mussels (n= 6 by station) was wet-weighted (g), then placed in a 150-mL decontaminated glass-beaker, with 50 mL of KOH (10%; **Li et al., 2019**).

Figure 2. Agglomerate of the dark false mussel *Mytilopsis leucophaeata* in laboratory.

Samples were heated (40°C) for 48h, and digested samples were filtered in glass-fiber membrane (0.6 µm) using a vacuum system.

Results

Microplastics were found in all samples of soft-tissue mussels (n= 60) from RFL. The concentration (mean ± SD) found in *M. leucophaeata* was 35.96 ± 47.64 microplastics g soft-tissue wet weight^{-1}. Moreover, minimum and maximum concentrations were, respectively, 2.27 and 241.56 microplastics g soft-tissue wet weight^{-1}.

Microplastics were distinguished in seven categories (**Fig. 3 and Fig. 4**) with different occurrence in samples (%): fiber (43.3%), fragment (34.3%), film (16.3%), sponge/foam (4.9%), pellet (0.57%), rope/filaments (0.17%), and undefined (0.4%).

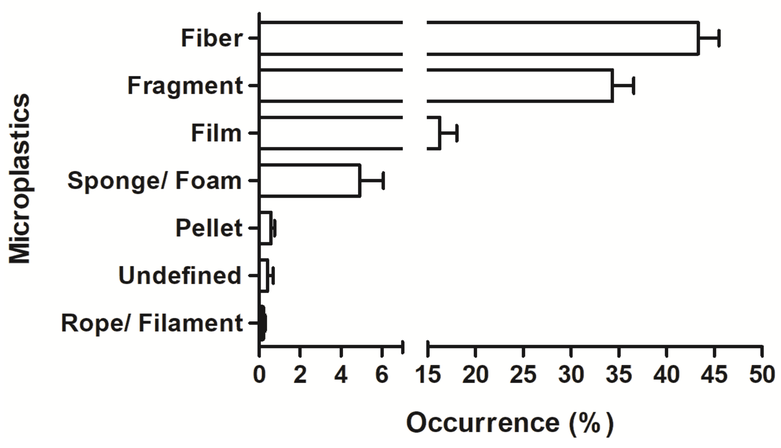

Figure 3. Mean ± SE of occurrence (%) of each category of microplastics found in soft-tissue of *M. leucophaeata* from RFL.

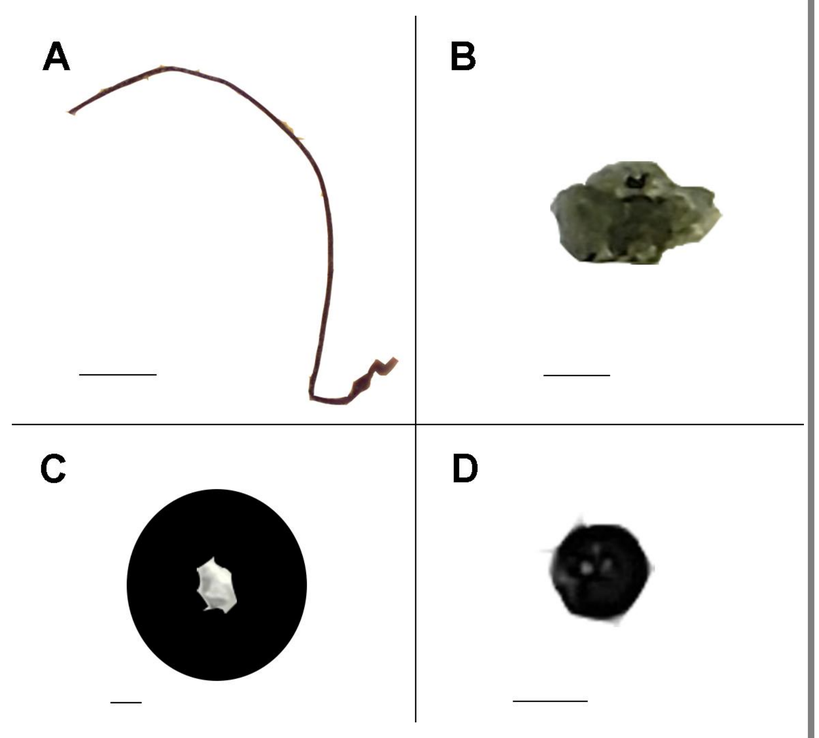

Figure 4. Microplastics found in *M. leucophaeata*. (A) Fiber, (B) Fragment, (C) Polystyrene foam, and (D) Pellet. Scale bars: 500 µm (A), 200 µm (B), and 100 µm (C and D).

Thirteen colors of microplastics were found, but transparent (55%), black (11%), and white (9.4%) were the most common (**Fig. 5**).

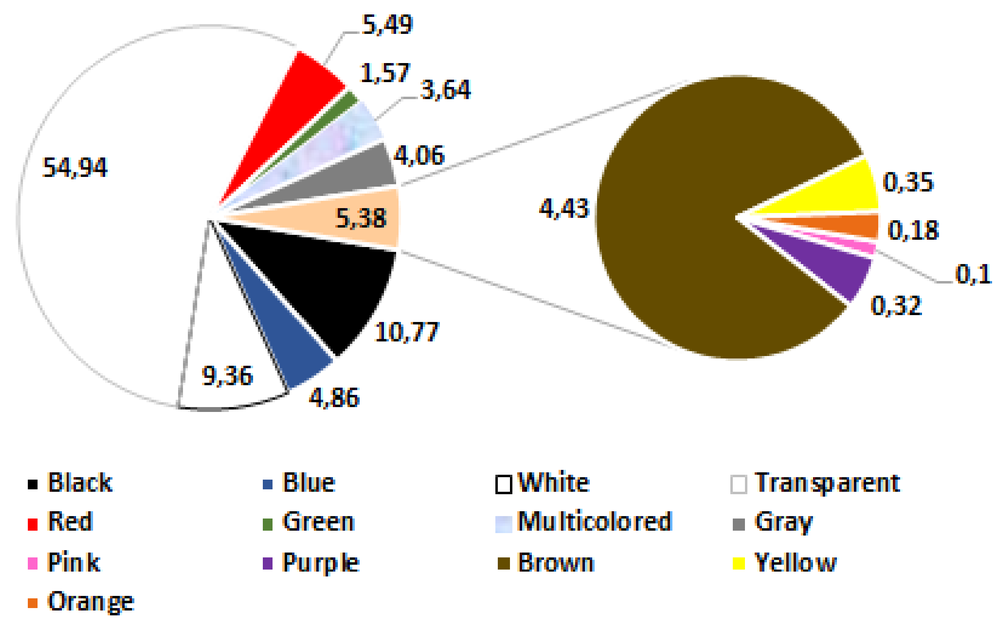

Figure 5. Percentage of microplastic occurrence by color (%) in soft-tissues of *M. leucophaeata* from RFL.

Conclusion

Mytilopsis leucophaeata were useful to assess microplastic contamination in RFL and might be preferentially used in other invaded systems instead of native and often threatened bivalves.

Our results confirm bivalve's potential use as bioindicator of coastal microplastic pollution.

Acknowledgements

FAPERJ Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro
CAPES
CNPq

References

Li *et al*., 2019. Environmental Pollution 244:522–533.
Rizzo *et al*., 2014. Marine Biodiversity Records 7:e129.
Rodrigues *et al*., 2021. Annals of the Brazilian Academy of Sciences 93:1–19.
Rodrigues *et al*., 2022. Biological Invasions 24:2245–2260.