

Seasonal distribution of microplastics and anthropogenic particles in four commercial marine species from the Arcachon Bay (North-East Atlantic, France)

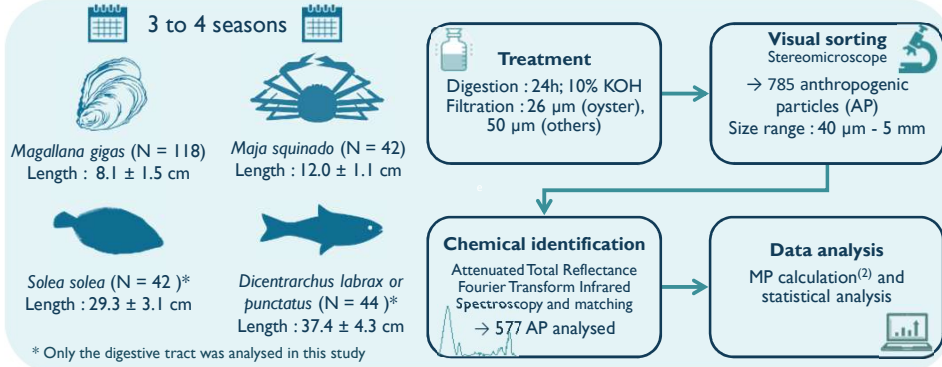
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Context

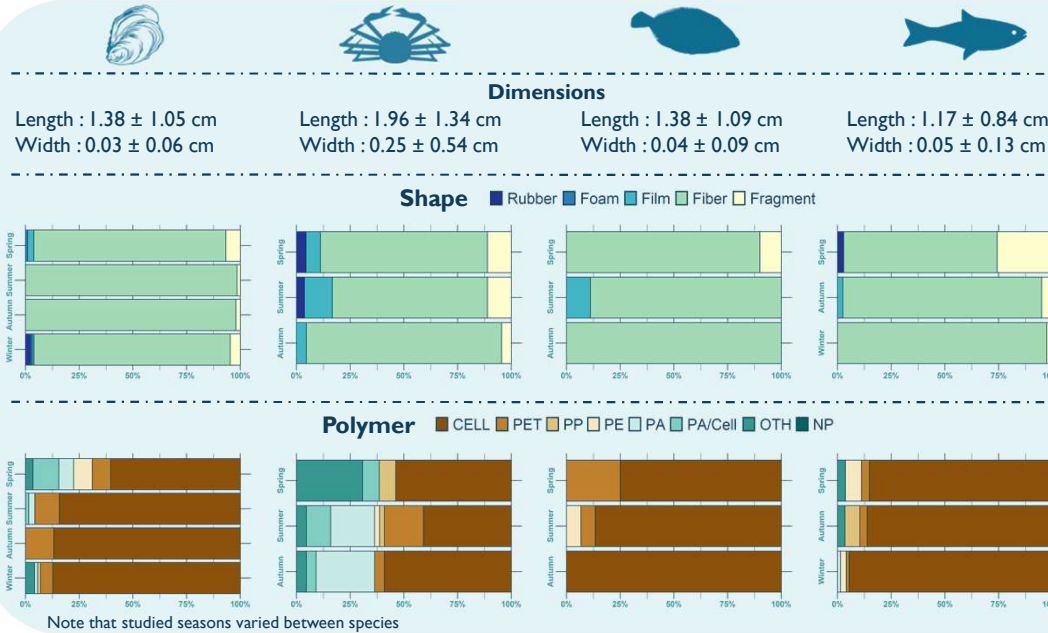
Since the beginning of plastic production, around 4900 million tons of plastic entered the natural environment⁽¹⁾. Once in the environment, they are fragmented through weathering, physical and biological processes. Plastic items with a size inferior to 5 mm are classified as **microplastics (MP)**. They **represent a real threat for marine life** as they overrun every marine compartments and can be easily ingested by a wide range of organisms. Moreover, additives and sorbed contaminants carried by MP represent an additional risk of toxicity when ingested.

Here, **MP uptake at several seasons was described in four commercial marine species** from the Arcachon Bay.

Materials & methods



Characterization



Main findings

- Lengths under 2 mm were mostly measured (from 58.7% to 87.3%)

- Fiber shape was mainly reported (from 77.7% to 95.2%)

- Cellulose (CELL) polymer was mainly identify (from 43.7% to 90.8%)

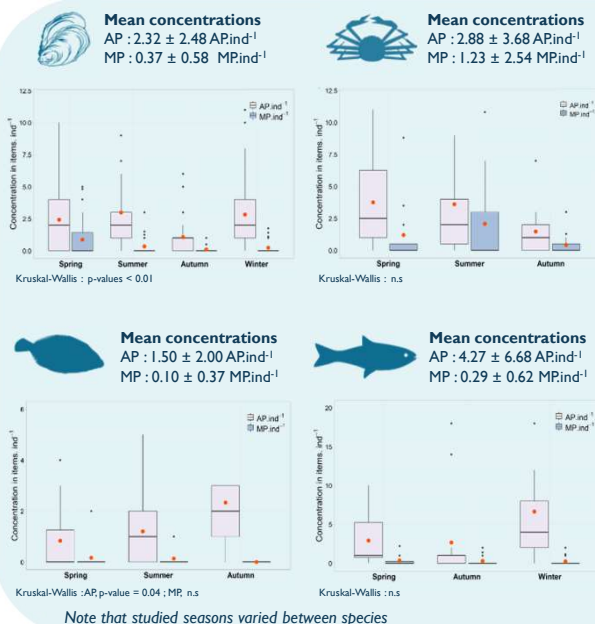
- Textiles tear and wear (e.g. cotton, rayon, viscose)

- Substantial uptake of PA in spider crab in summer and autumn

- Fishing line used for its capture corresponds to recovered MP

AP & MP profiles followed similar trends for all studied times and species

Concentrations



Anthropogenic particle (AP)

- Oysters: Lower in autumn than in all other seasons (Dunn test, p-values < 0.02)
- End of the reproduction period, resting phase

- Common sole: Higher in autumn than in spring (Dunn test, p-value = 0.04)

- Other species: stable over seasons

Microplastic (MP)

- Oysters: Lower in autumn than in spring (Dunn test, p-value = 0.01).

- Other species: stable over seasons

Oysters contamination followed seasonal variations, while other species mostly not

Key findings

- AP and MP were found in all species at almost all seasons.
- Shape and polymer distributions were relatively homogenous across species and seasons. **Most of AP were fibers made of cellulose**, suggesting that they come from textile tear and wear⁽³⁾. Studied species with different ecological and physiological traits tended to follow the same pattern of contamination.
- In oyster, lower AP concentrations were reported in autumn, corresponding to a resting period for Pacific oyster. Otherwise, few or no seasonal variations were found for other species, both for MP and AP concentrations. It may be explain by their feeding mode as they are predators while oysters are filter feeders.
- Overall, studied species from the Arcachon Bay displayed **lower MPs contamination than in other bays**^(4,5,6). However, it have to be noticed that, except for Pacific oyster, studies on other species are still scarce.

References
 (1) Geyer et al., 2017. Sci Adv 3, (2) Lefebvre et al., 2021. Sci. Total Environ. 797.
 (3) Pirce et al., 2016. Environ. Sci. Pollut. Res. 23, (4) Phuong et al., 2018. Mar. Pollut. Bull. 129.
 (5) Welden et al., 2018. Environ. Pollut. 239. (6) Gasperi & Cachot. 2021. Programme Seine-Aval 6.