University Centre Sparsholt Report from the 2025 Thames Fishing Experiment

Study leads: Kerry Perkins & Ashlie Newman (University Centre Sparsholt)

Similar exposure, different outcomes: Species-specific microplastic processing in Thames fish.

Having completed previous microplastic studies on local rivers this study aims to investigate the liver health of fish from the river Thames when faced with the combined impact of microplastics and Polychlorinated Biphenyls (PCBs). By determining if the combination of microplastics and PCBs has additive or synergistic effects important insights could be gained for river pollution management and further fish health monitoring.

Study aim

To determine if the combination of microplastics and PCBs has additive or synergistic effects, understanding this could provide an important insight for river pollution management and further fish health monitoring.

Objectives

- To measure the concentration of PCB found in the liver.
- To measure the abundance of microplastics found in the liver.
- Analysis of liver health.
- Determine if microplastics and PCB exposure has an additive or synergistic effect on liver health.
- Compare levels of PCBs and microplastics from previous data collected from the experiment.

This research is important because it helps to identify how PCBs and microplastics interact in aquatic environments and how they affect fish health, it can also provide further understanding on what this could mean for aquatic ecosystems, species diversity and human health. It will contribute to gaps in research as both PCBs and microplastics have been studied individually whilst only a few studies have looked at combined effects. It can also provide valuable data for environmental policy and conservation strategies.

Summary of results

Understanding whether microplastic ingestion reflects environmental exposure or biological processing remains a central challenge in aquatic pollution research. The study undertaken addressed this question by examining microplastic abundance and composition in European sea bass and European flounder across gut regions (stomach and intestine). Total microplastic abundance did not differ significantly between species or

gut regions, and no relationship was observed between fish weight and microplastic load. In contrast, strong species-specific differences in microplastic composition and distribution were identified, with a significant interaction between species and gut region. Fibres dominated across samples, but their distribution varied between species and digestive compartments, indicating that both ecological exposure and physiological processing influence retention. Sea Bass had a higher prevalence of fibres within the stomach region compared to flounder which contained a higher number within the intestine region (Figure 1).

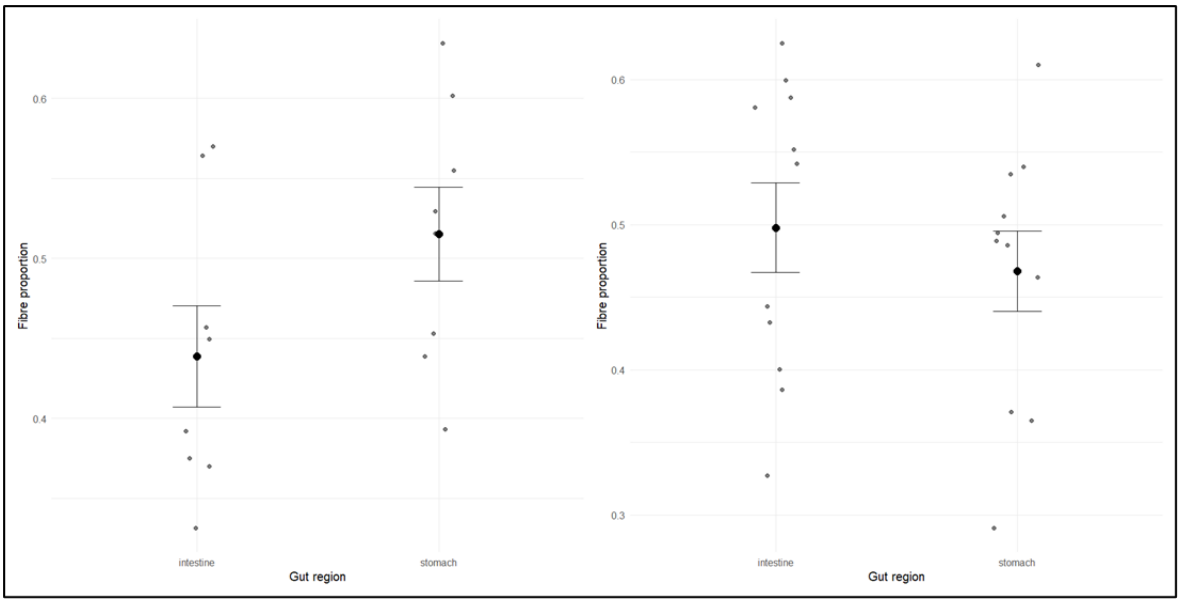


Figure 1: Boxplot visualising the interaction between sea bass (left side) and flounder (right side) between gut regions.

These differences within the species reflect variation in feeding strategy, habitat use, and gut transit dynamics, with benthic and pelagic species encountering and processing microplastics differently. Overall, Thames fish species prove an interesting model particularly around ingestion and retention of microplastics in commonly eaten fish.