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Ingestion of microplastics by fish from the Yellow Sea

Xiaoxia Sun and Qingjie Li
Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China (xsun@qdio.ac.cn)

Microplastics (MPs) are a major global issue in the marine environment, and fish inhabiting coastal environments are susceptible to the ingestion of MPs. Knowledge regarding MPs in fish along the coast of China is very limited. In this study, the characteristics and retention of MPs in 19 fish species in the Yellow Sea were systematically studied. MPs were detected in all of the fish species sampled. Overall, 552 pieces of plastic were removed from a total of 1320 fish, including 546 pieces of MP [U+FF08]99%[U+FF09](0.41 MP/fish) and 6 pieces of meso/macroplastic (1%). Three MP types were found: fibers, pellets, and fragments, which accounted for 67%, 22%, and 11% of the total, respectively. MP length ranged from 16 to 4740 μm, with an average of 941 $\pm$ 43 μm. The average lengths of the fibers, pellets, and fragments were 1233 $\pm$ 57 μm, 263 $\pm$ 24 μm, and 503 $\pm$ 91 μm, respectively, and MP length was positively correlated with fish length. Fourteen polymers were detected, with organic oxidation polymers (40%) being most abundant, followed by polyethylene (22%) and polyamide (11%). The retention of MPs in fish was affected by sampling areas and fish weight. Fish collected from the area adjacent to the Bohai Sea and the Yangtze River Estuary were found to possess higher levels of MPs than those collected from the center of the Yellow Sea. The average number of MPs per fish (which ingested MPs) was negatively correlated with fish body weight. The retention of MPs may affect the quality and quantity of fishery resources in the Yellow Sea, especially the commercial fish. It is suggested that future studies be conducted to determine the ingestion rate, retention time, and egestion rate of MPs by fish to enable a rational risk assessment by combining the field results.