

Microplastics caught in herring gill rakers: illustration by scanning electron microscopy

Collard France¹, Krishna Das² and Eric Parmentier¹

¹ Functional and Evolutionary Morphology Laboratory
University of Liège, Allée de la Chimie 3, 4000 Liège, Belgium
E-mail: fcollard@doct.ulg.ac.be

² Laboratory of Oceanology
University of Liège, Allée de la Chimie 17, 4000 Liège, Belgium

Plastics are persistent and have accumulated in the oceans for several decades. Plastics may adverse wildlife in many ways: they can be ingested by marine vertebrates and cause internal wounds in the digestive tract. Plastics are also vectors of organic pollutants including PCBs and DDT. Once ingested, plastics may release these pollutants in the organism. Plastics present in the marine environment fragment in small pieces by mechanical stress and UV radiation leading to the so-called microplastics smaller than 5mm. Little is known about microplastics ingestion and toxicity in planktivorous fish such as the herring, *Clupea harengus*. Planktivorous fish have gill rakers, which may function as particle trap for microplastics. This study aims to describe and characterise microplastics present on gills of the herring, *Clupea harengus*. Fifteen gill cavities were sampled in January 2013 in the Channel and the North Sea during the IBTS fishery campaign (organized by the IFREMER). Gills were placed in a formaldehyde/seawater solution until preparation for scanning electron microscopy (SEM). SEM was used in order to detect microplastics which are too small to be observed by a dissection microscope, to compare them with the distance between gill rakers and to characterise the surface and the shape of microplastics.

Scanning electron microscopy revealed large variety of microplastics, which lengths ranged from 0.05 to 5mm. Relationship between microplastics length and distance between gill rakers was analysed on the same branchial arch. The present study revealed the presence of microplastics in an edible species of high economic value and raise question about potential impact on the herring and its consumers, including human beings.