

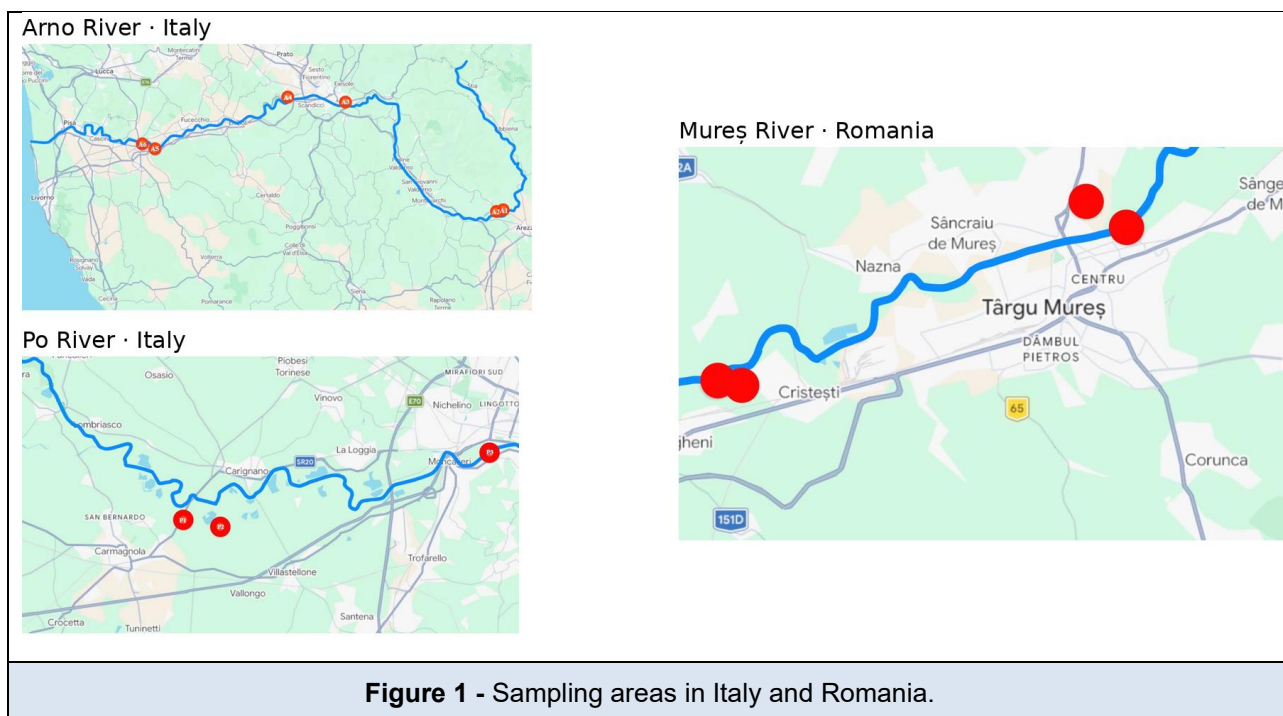
Tracking microplastics in Italian and Romanian waters

First monitoring activities in the Arno, Po and Mureș river systems.

Within WATERPATH, we have begun investigating how small plastic particles and fibers, as well as organic chemicals occur along connected water systems. Researchers from the Universities of Torino and Firenze (Italy) and Babeș-Bolyai University (Romania) have combined field sampling with laboratory analysis. The first results show differences between locations and sampling seasons, helping us to identify where closer investigation is needed.

Sampling across countries and seasons

Our initial study covered six sites along the Arno and three along the Po in Italy, together with four sampling points in the Mureș system in Romania, including drinking water and wastewater treatment facilities, so covering local ecosystem services. Campaigns took place in autumn 2025 and winter 2026, followed by summer sampling in the Italian rivers in June 2026. This approach lets us compare seasonal snapshots and examine how fragments numbers change along each system.



From a water sample to a particle record

In the laboratory, we filtered water samples, removed organic matter and separated fragments for further examination under a microscope. We recorded their number, shape, colour and size. Infrared spectroscopy then helped identify the type of plastic in fragments that were recovered.

Alongside this work, we screened water samples for organic chemicals that could interact with microplastics, using gas chromatography coupled with mass spectrometry.

What the first samples are telling us

Fibres were the most common particle shape in the initial visual assessment. Fragments showed a wider variety of colours and forms. Among the fragments successfully separated and analyzed by infrared spectroscopy, we identified polypropylene and polyethylene, plastics widely used in everyday products.

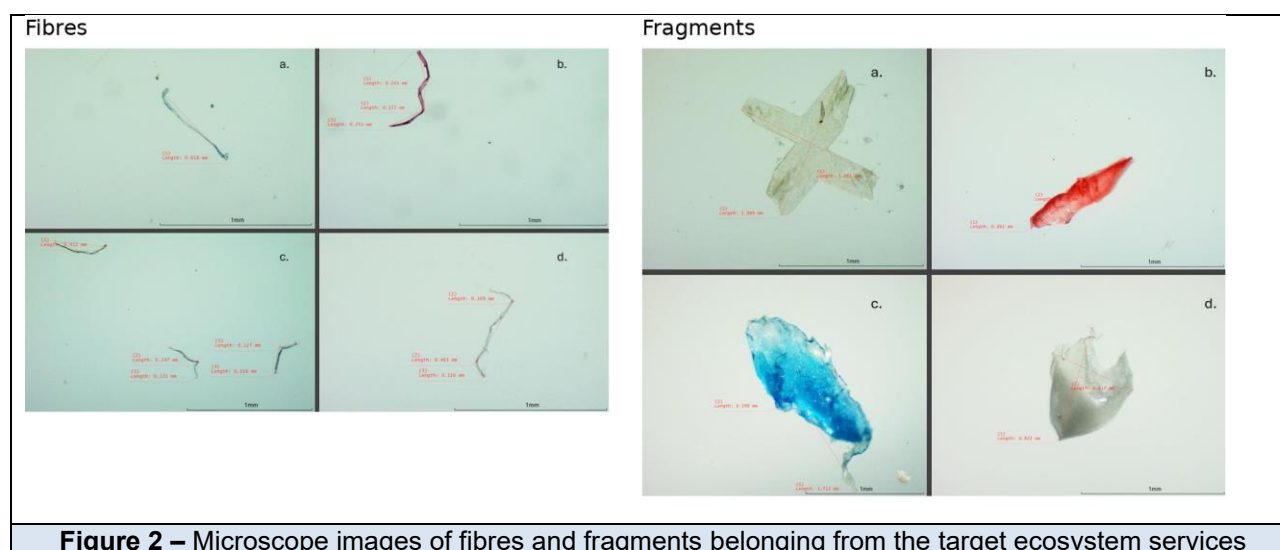


Figure 2 – Microscope images of fibres and fragments belonging from the target ecosystem services

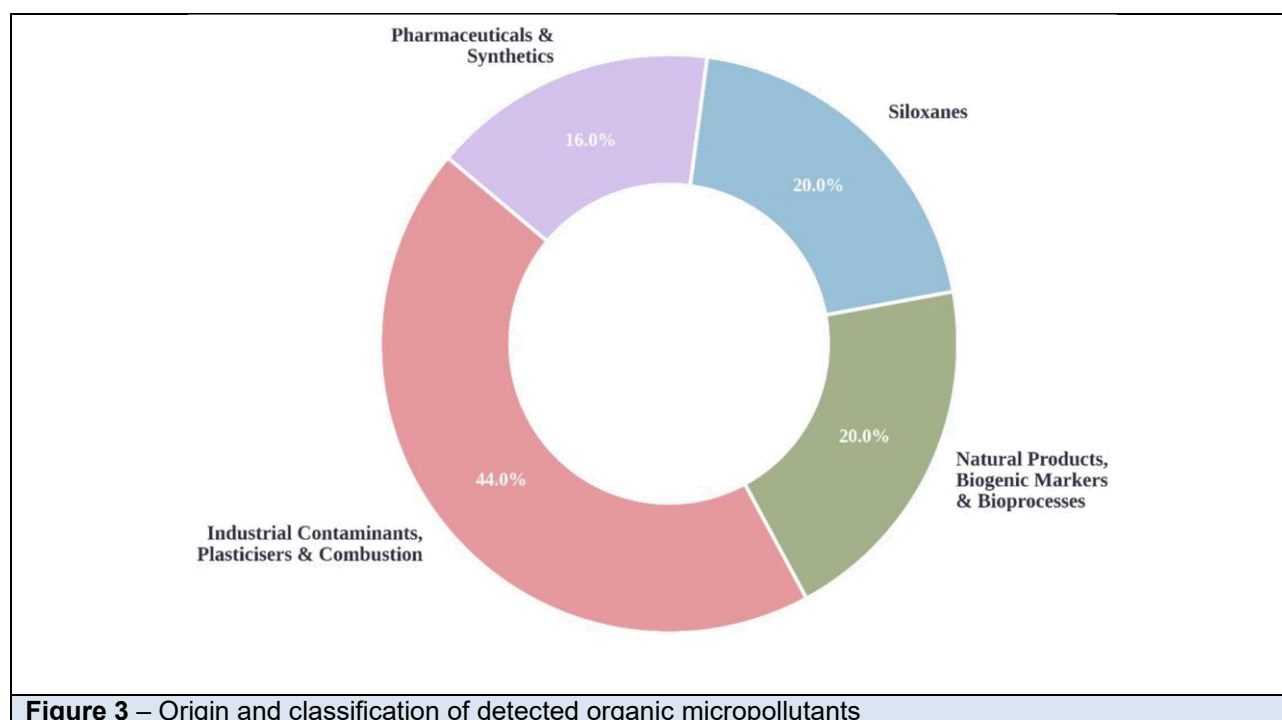
Different patterns along the rivers

The Arno surveys recorded higher particle numbers in the lower path of the river, with a maximum of about 15 particles per litre at Pontedera (PI) in autumn. In the Po river basin, the highest value was found at Turin in winter, at about 12 particles per litre. Water samples belonging to the WWTP outlet does not register a statistical difference from the surface irrigation channel.

At the treatment facilities studied in the Mureş system, comparisons of influent and effluent water indicated reductions in particle counts of around 76–84% for drinking water treatment and 73–75% for wastewater treatment in the two campaigns. Some particles remained after treatment, in line with the removal performances reported in literature.

Looking for chemicals present in the target water samples

As for Italian basins, our broad chemical screening produced a list of (polar and non-polar) organic compounds that could tentatively match to compounds associated with plastic additives and industrially/naturally derived substances. This creates a first chemical profile of the samples that needs to be further investigated to study a possible “Trojan Horse” effect towards microplastic.



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