

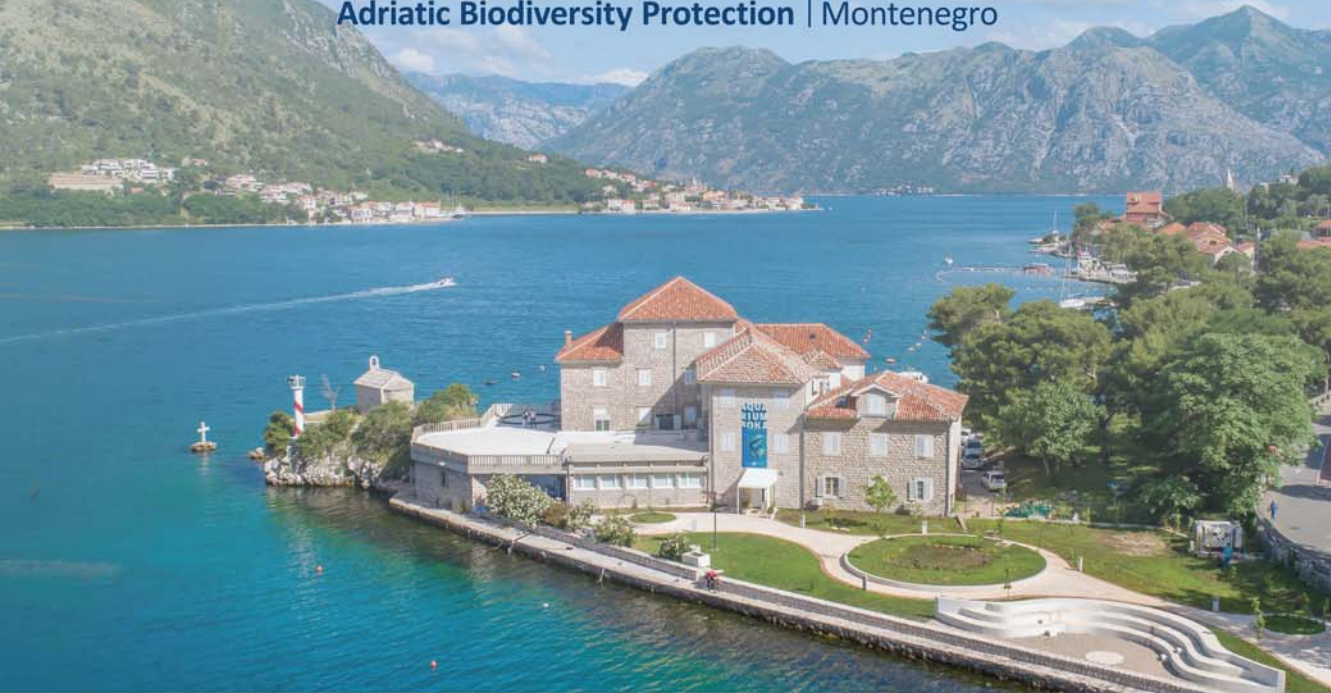


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(Micro)Plastic pollution in freshwater ecosystems- a model organism

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Abstract

Plastic pollution is recognized as ubiquitous and different approaches have been used to detect and evaluate effects on aquatic biota. Here, we present Asian clam *Corbicula fluminea* (Müller, 1774) as a suitable model organism for detecting microplastic pollution in freshwater ecosystems. The study was conducted on the Danube River and its tributaries. Following the multi-habitat procedure, specimens were sampled using a hand net (ap. 25 cm × 25 cm, mesh size 500 µm) sampling. Out of a total of 51 sampling sites, *C. fluminea* was collected at 23 sites, whereas 15 sites were on the Danube and 8 sites on its tributaries. From each site 10 specimens were randomly selected. The shell length, shell width, total weight and body weight were measured. The samples were digested by alkaline method, using a KOH 10% solution and incubation at 65 °C for 12 h. Collected particles were photographed and assigned to one of 2 major microplastic categories: fibers and fragments. Categories were divided in subcategories based on the coloration of the particles. Particles were counted manually, photographed and measured by the use of Nikon SMZ 745T Stereomicroscope. All collected particles were measured in the program ImageJ. Microplastic particles were detected in all samples of *C. fluminea*, on average 5.59 ± 3.71 fibrils and 4.37 ± 2.46 fragments per organism; or 40.77 ± 73.75 fibrils and 25.84 ± 33.17 fragments per g body weight, 1998 in total. Medium-sized microplastic particles were dominant, with an average length of $0.43 \text{ mm} \pm 0.26$ in the Danube and $0.49 \text{ mm} \pm 0.26$ in the tributaries. Among fibers and fragments, blue fibers (81%) and transparent fragments (42.8%) were dominant. In order to confirm chemical composition of isolated microliter, 46 particles of the hard plastic from 14 sampling sites were analyzed with micro-FTIR spectroscopy analysis. Analyzed particles were detected as polyethylene-terephthalate and cellophane, most commonly.

Keywords: microplastic pollution, model organism, Asian clam, Danube, microFTIR spectroscopy



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