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BOOK OF ABSTRACTS

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Plastic entrapment by riparian vegetation across ecological gradients in European rivers: first insights from the Biodiversa+ RIPARIANET Project

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Plastic litter accumulating in riverine riparian habitats is a threat of global concern. Macrolitter items, being highly visible (items > 0.5 cm) and impactful pollutants, pose significant threats to biodiversity and ecosystem functioning. Although research recently started to address plastic entrapment, large-scale studies and predictive models aiming at reducing biases and uncertainties in understanding plastic accumulation are still scarce. Given those gaps, this study investigates plastic entrapment by riparian vegetation at different ecological scales and gradients across European rivers. We focused on six river basins across Europe, covering the boreal (Sweden), continental (Germany), alpine (Trento, Italy), Mediterranean (Rome, Italy), and Atlantic (Northern Spain, Northern Portugal) climatic regions as part of the European project Biodiversa+ RIPARIANET. By surveying six European basins, we aim to unveil riverine macrolitter accumulation in riparian areas across biogeographic regions. We found that riparian vegetation acts as a sink for macrolitter, with the highest trapping value recorded in the Tiber River catchment (Italy) and the lowest in the Sävar River basin (Sweden). Among river basins, we highlighted a latitudinal gradient for plastic entrapment by vegetation, which increased from North to South. Among macrolitter items, we found that plastics was the most abundant litter type, followed by textile items. Additionally, we observed most macroplastics near the downstream zone of rivers rather than the upperstream zone. Urbanization, land use, river discharge, river sinuosity, and vegetation structure are crucial predictors of macroplastic accumulation. Our findings shed light on how macroplastics accumulate in European riparian zones, emphasizing their ecological and societal implications and potentially supporting environmental managers in addressing macrolitter removal from the environment. Monitoring macroplastic accumulation is essential to understand the interactions between pollutants and ecosystems, enabling the development of effective conservation strategies. Given the potential impacts on biodiversity and ecosystem resilience, specific monitoring and clean-up activities should be prioritized to protect riparian ecosystems under future conditions.