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INNOVATION FOR TOMORROW: PROGRESS IN SAFE AND SUSTAINABLE CONCEPTS



ABSTRACT BOOK

integrated sampling. Analysis included residue of 109 pesticides, in surface water and in periphyton, 37 fatty acids, ash-free dry mass, and 11 photosynthetic pigments in periphyton. In periphyton, up to 31 pesticides were detected, with distinct chemical profiles observed in the two agricultural streams. The pesticide composition in periphyton differed from that in the water. Water profiles showed greater variability over time and were dominated by water-soluble substances. In contrast, periphyton accumulated more hydrophobic compounds, some of them banned for years, suggesting longer-term, chronic exposure. Pigment analyses revealed high algal biomass, predominantly composed of diatoms, but lower diversity in the agricultural streams compared to the reference stream. Diatom biomass was strongly correlated with the polyunsaturated fatty acids EPA and DHA concentrations, markers of high nutritional value produced mainly by diatoms. Linear regression revealed a general, though not significant, negative relationship between pesticide concentrations in periphyton and diatom biomass or EPA levels. We hypothesize that at low pesticide concentrations, other stressors, such as high nutrient load, are more prominent. However, beyond a certain threshold, pesticide exposure may become a primary stressor, reducing nutritional quality of their periphyton and altering algal community. These findings highlight that periphyton in agricultural streams accumulate a variety of pesticides, exhibit high biomass and display altered algal community structure and fatty acid profiles.

2.03.P-We044 Investigating the Role of Pesticides and Pharmaceuticals in Riparian Ecosystems: Insights from the RIPARIANET Project

Monika Laux¹, Maria Cristina Bruno², Jose Barquin³, Laura Concostrina-Zubiri³, Luca Gallitelli⁴, Micael Jonsson⁵, Morgan Hughes⁵, Giorgio Pace⁶, Massimiliano Scalici⁷, Stefano Larsen² and Ralf Schulz¹, (1)Institute for Environmental Sciences, University of Kaiserslautern-Landau, Germany, (2)Research and Innovation Centre, Fondazione Edmund Mach; National Biodiversity Future Center, Università di Palermo, Italy, (3)IHCantabria, Instituto de Hidráulica Ambiental, Universidad de Cantabria, Spain, (4)University of Roma Tre, Department of Sciences, Italy, (5)Department of Ecology and Environmental Science, Umeå University, Sweden, (6)Centre of Molecular and Environmental Biology/Aquatic Research Network Associate Laboratory, Department of Biology, University of Minho; Institute of Science and Innovation for Bio-Sustainability, University of Minho, Portugal, (7)University of Roma Tre, Department of Sciences; National Biodiversity Future Center, Università di Palermo, Italy

Riparian zones are natural ecotones that contribute greatly to biodiversity and ecosystem services. As Europe commits to protecting 30% of its land and sea, riparian networks "blue-green arteries" connecting ecosystems across elevation gradients offer critical opportunities for targeted conservation. The RIPARIANET project focuses 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 to optimize conservation strategies for these ecosystems. This study investigates how pesticides and pharmaceuticals entering riparian ecosystems through water affect aquatic and terrestrial food webs. By examining contaminant transport and accumulation across water, biofilms, emerging insects, riparian spiders, and bats, we aim to assess ecosystem-level impacts and distribution of contaminants across trophic levels. Our approach combines GIS-based modeling with comprehensive field data collected in 2024. We analyzed a wide range of contaminants in field-collected samples using UHPLC-ESI-MS/MS. Our findings will shed light on how pesticides and pharmaceuticals are transported into aquatic and terrestrial food webs and their potential impacts on biodiversity and ecosystem resilience. As environmental stressors such as chemical pollution interact with broader challenges like climate change, understanding these dynamics is crucial for developing conservation strategies that protect riparian ecosystems under future conditions. Biodiversa+ RIPARIANET project

2.03.P-We045 Effects of Flood-Mediated Pollutant Transfer on Total Polyphenol Content in Riparian Plants

María José Gormaz-Aravena, Franziska Fiolka, Sven Korz, Katherine Munoz, Franziska Middendorf, Stephane Mutel, Collins Ogbeide, Alessandro Manfrin and Ralf Schulz, Institute for Environmental Sciences, University of Kaiserslautern-Landau, Germany

Flooding can transfer pollutants from aquatic to terrestrial ecosystems, acting as a contamination pathway for riparian plants. Due to land-use changes and more frequent and intense rainfall events caused by climate change, both flooding frequency and duration are expected to rise over the next decades. This increase will intensify the floods ability to act as an exposure pathway to the riparian vegetation, where agricultural pesticides are transported back to land in riparian zones. This strongly affects the vegetation stress-mediated response, where polyphenolic compounds are involved in defense mechanisms against biotic and abiotic stressors. Research on contaminants entering riparian lands remains limited, especially regarding their impact on plant resilience. This study investigated the effect of flood-mediated pesticide transfer under different flooding frequencies (after 1 and 4 floods) and durations (0, 3, 7 and 14 days) on