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TH173 Fungicides: The unusual suspects in aquatic risk assessment

J.J. Rasmussen, Aarhus University / bioscience; N. Cedergreen, University of Copenhagen / Department of Plant and Environmental Sciences; M.A. Bjergager, University of Copenhagen / Faculty of Science; M. Liess, UFZ Center for Environmental Research / Department of SystemEcotoxicology; R. Schaefer, University Koblenz Landau; U.S. McKnight, Technical University of Denmark DTU / Environmental Engineering; D. Fernández, University KoblenzLandau / Quantitative Landscape Ecology; B.J. Kefford, University of Canberra / Department of Environmental Science; W.A. Battaglin, T. Reilly, K.L. Smalling, US Geological Survey; J. Kreuger, Swedish University of Agricultural Science / Centre for Chemical Pesticides; M. Stenrod, Bioforsk; E. Carazo, Universidad de Costa Rica; B. Kronvang, Aarhus University / Department of Bioscience. Pollution from insecticides and herbicides are increasingly considered as significant risks to organisms and ecosystems, however, fungicides have received little attention. This is surprising as fungicides target microorganisms, which are pivotal for several ecosystem processes such as nutrient cycling and organic matter decomposition. Data on fungicide occurrence in water from 123 streams (primarily agricultural catchments) and 4 continents was compiled, and we examined whether fungicide pollution threatens microorganisms and affects organic matter decomposition. We found a 50% reduction in organic matter decomposition in more than 50% of the streams that may be attributed to fungicides. Existing literature containing fungicide occurrence data from streams and microbial leaf litter decomposition was used to establish thresholds for fungicide effects on microorganisms and organic matter decomposition. Especially the strobilurin, triazole and imidazole fungicides were responsible for high fungicide toxicity in water samples. These compounds comprised approximately 60% of total fungicide concentrations but contributed with 97% of the total toxicity to microorganisms. In consequence, we call for increased attention regarding these groups of compounds. The reduction has profound implications for the carbon cycle in stream ecosystem.