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Response of Aquatic Leaf Associated Microbial Communities to Elevated Leachate DOC: A Microcosm Study

Jeanette Schlieff* and Michael Mutz

Brandenburg University of Technology, Cottbus, Department of Freshwater Conservation, Seestr. 45, D-15526 Bad Saarow, Germany; e-mail: j.schlieff@limno-tu-cottbus.de

*Corresponding author

Abstract:

In Central Europe climate change will increase summer droughts, which cause both, premature leaf fall and fragmentation of small streams during summer and early autumn. As a consequence dissolved organic carbon (DOC) leached from leaves will be dispersed into pools with long water residence time. A microcosm experiment was performed to test the effect of high concentrations of leachate DOC and the relative importance of labile and refractory leachate compounds on leaf associated microbial parameters. In microcosms leaf discs colonized in a stream were exposed to high concentrations of either leaf leachate, glucose or tannic acid. Leaf associated respiration, fungal sporulation, leaf mass loss and fungal biomass (ergosterol) were measured during a 3 weeks experimental period and compared to control without DOC amendment. The results imply that depending on source and composition elevated leachate DOC may have variable effects on microbial mediated litter decomposition. Our findings suggest reduced microbial decomposition rates in pools of fragmented streams receiving premature leaf fall.

Key-words: Drought, stream fragmentation, leaf litter, aquatic hyphomycetes, litter decomposition