Differences in water depth determine leaf-litter decomposition in streams: implications on impact assessment reliability

Leaf-litter decomposition is a widespread functional indicator to assess the stream ecosystem status. However, the spatial location of leaf-bags could distort the impact assessment since intrinsic features of a given site have an important role in the spatial distribution of macroinvertebrates, which could affect decomposition rate. A source of variability that can be easily controlled is the water depth at which bags are incubated in stream bed. Therefore, we tested if water depth within a same mesohabitat (riffles) can determine decomposition rates. Due to the seasonal variability of macroinvertebrate assemblages in temperate regions, the study was performed in autumn-winter and spring to test the consistency of the findings. In three streams from North of Spain 15 mesh bags with alder leaves were placed in riffles covering a gradient of depths. Depth had a positive effect on decomposition rates and biomass of associated total invertebrates and shredders in autumn-winter, fauna variables helping to explain the differences in rates. In spring, depth affected negatively rates, the observed variability being weakly explained by invertebrates, which did not show differences along depth. Despite the opposite trend between seasons, water depth influences the decomposition rates, which may reduce or increase differences among systems if the water depth distribution is greatly biased. Our study highlights the importance of covering a similar range of water depths in the different systems being compared.

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