Topic: Ecosystem processes

Effects of riparian plant diversity on leaf-litter decomposition along an eutrophication gradient

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This study addressed the effects of riparian plant diversity (identity and number of species) and stream eutrophication on leaf-litter decomposition and the associated decomposer communities. For that, leaves of alder, chestnut, eucalyptus, plane tree and oak, alone or in mixtures with 2, 3 and 5 species were placed in coarse-mesh bags and immersed in six low-order streams along an eutrophication gradient. Leaf species identity affected leaf mass loss, and fungal and invertebrate biomasses on leaves. Invertebrate biomass was not affected by leaf species number, but fungal biomass was higher in mixtures with 5 leaf species, suggesting that fungi depend on riparian plant diversity more than invertebrates. Leaf mass loss was higher in leaf mixtures than in single leaf species. Higher N immobilization occurred in moderately and highly eutrophic streams comparing to the most oligotrophic one. Also, N immobilization was higher for leaves with lowest initial N concentration (plane tree). Apart from the most eutrophic stream, a positive linear relationship between initial N concentration in leaves and leaf mass loss was found, and the slopes increased with increasing eutrophication. This suggests that the positive effects of leaf quality on litter decomposition can be enhanced by moderate eutrophication. Leaf-litter decomposition in mixtures was higher than that expected based on the sum of decomposition of individual leaf species, but these effects were not evident in the most eutrophic streams. Overall results suggest that moderate eutrophication may enhance leaf quality effects and attenuate leaf diversity effects on leaf decomposition.

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