

Effects of riparian plant diversity loss on detritus food webs become more pronounced at longer times

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We examined the potential long-term impacts of riparian plant diversity loss on diversity and activity of aquatic microbial decomposers and on the feeding behaviour and body composition of a stream invertebrate shredder. Microbial assemblages were obtained in a mixed-forest stream by immersion of mesh bags containing alder, oak and eucalyptus leaves, commonly found in riparian corridors of Iberian streams. Simulation of species loss was done in microcosms by including a set of all leaf species, retrieved from the stream, and non-colonized leaves of 3, 2 or 1 leaf species. Leaves were renewed every month throughout 6 months, and microbial inoculum was ensured by keeping a set of colonized leaves from the previous month. After 2 (short time) and 6 months (long time) of plant species loss, microbial diversity, leaf mass loss and fungal biomass were assessed in each leaf species. Leaves from all leaf treatments were used to feed invertebrate shredders. Molecular diversity of fungi and bacteria, as the total number of OTUs per leaf diversity treatment, decreased with leaf diversity loss. Fungal biomass on oak and eucalyptus leaves tended to decrease linearly with leaf species loss. Decomposition of alder and eucalyptus leaves was affected by leaf species identity, mainly after long time. Leaf decomposition of alder decreased when mixed with eucalyptus, while decomposition of eucalyptus decreased in mixtures with oak. Time led to an increase of the positive diversity effects on leaf consumption and FPOM production by the invertebrates. Regarding invertebrates' body composition, the % of C increased and the % of N decreased when animals were fed with leaves after long time of diversity loss. Moreover, leaf identity affected invertebrates' body composition after feeding, suggesting deviation from strict homeostasis. Results suggest that effects of leaf diversity on microbial decomposers depended on leaf species number and also on which species were lost from the system, especially after longer time. Also, leaf diversity affected leaf consumption and FPOM production by invertebrates, as well as animals' body composition. This may have implications for the management of riparian forests to maintain stream ecosystem functioning.

FEDER-POFC-COMPETE and FCT supported this study (PEst-C/BIA/UI4050/2011, PTDC/AAC-AMB/113746/2009 and PTDC/AAC-AMB/117068/2010), SD (SFRH/BPD/47574/2008) and IF (SFRH/BD/42215/2007)