# Structural and functional measures of invertebrate and fungal communities as predictors of eutrophication

Ana Pereira[1]*, Paulo Geraldes*, Eva Lima-Fernandes, Isabel Fernandes, Fernanda Cássio and Cláudia Pascoal

[1] anapereira@bio.uminho.pt

*Both authors gave equal contribution

Centre of Molecular and Environmental Biology (CBMA), Department of Biology, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

To assess how eutrophication affects leaf-litter decomposition and the associated biota in streams, we examined i) the structure of invertebrate and fungal communities and ii) leaf mass loss of different plant species. Leaves of alder, chestnut, eucalyptus, plane tree and oak were placed in coarse-mesh bags and immersed in 6 low-order streams along an eutrophication gradient during 38 days. Additional benthic invertebrate samples were collected with a hand-net. The values of the IBMWP biotic index applied to benthic invertebrates increased from low to intermediate levels of eutrophication and then dropped sharply at high and very high levels of eutrophication. Cluster analysis applied to leaf-associated invertebrate and fungal communities separated the streams according to the eutrophication level. The % of shredders on leaves decreased, whereas the % of oligochaetes increased along the eutrophication gradient. Invertebrate biomass and density, as well as fungal biomass and reproduction increased along the eutrophication gradient, but decreased in the most eutrophic stream. Alder leaves decomposed faster than other leaf species. A hump-shaped relationship was established between leaf mass loss and the eutrophication gradient for all leaf species, suggesting that leaf decomposition is a valuable tool to assess changes in stream water quality. Results suggested that both structural and functional measures of invertebrate and fungal communities are good predictors of stream eutrophication when assessing the ecological integrity of streams.

FEDER-POFC-COMPETE and FCT supported this study (PEst-C/BIA/UI4050/2011 and PTDC/AAC-AMB/117068/2010) and IF (SFRH/BD/42215/2007).