

Sofia Duarte; Cláudia Pascoal; Fernanda Cássio

Departamento de Biologia. Universidade do Minho. Campus de Gualtar. 4710-057 Braga. Portugal

Effects of zinc on leaf decomposition by fungi in streams

The ubiquitous presence of aquatic fungi in metal polluted streams have increased interest on the effect of heavy metals on fungi during decomposition of organic matter. In this work, microcosm experiments were used to assess the effects of zinc on leaf decomposition by aquatic fungi. In parallel, leaf decomposition was followed in the stream to validate microcosm results. Stream experiments were carried out at the source of the Este River (Northwest Portugal). This river flows through the city of Braga and its Industrial Park where heavy metals, including zinc, become a problem in both stream water and sediments. Leaves colonized for 15 days in the stream were collected and exposed to zinc concentrations within the range occurring in either pristine or impacted streams. To evaluate zinc effects on the natural fungal assemblages, leaf mass loss, fungal biomass (from ergosterol concentration) and production (rates of [^{14}C]acetate incorporation into ergosterol), sporulation rates and diversity of aquatic hyphomycetes were determined.

At the source of the Este River the decomposition rate of alder leaves was 0.0741 d^{-1} and a total of 18 aquatic hyphomycete species were recorded during leaf immersion in the stream. *Articulospora tetracladia* was the dominant species, followed by *Lunulospora curvula* and two unidentified species with sigmoid conidia. Cluster analysis suggested that zinc concentration and exposure time affected the structure of aquatic hyphomycete assemblages, even though richness had not been severely affected. Both zinc concentration and exposure time significantly affected leaf mass loss, fungal production and sporulation, but not fungal biomass. Zinc exposure reduced leaf mass loss, inhibited fungal production and affected fungal reproduction by either stimulating or inhibiting sporulation rates. The results of this work suggested zinc pollution might depress leaf decomposition in streams due to changes in the structure and activity of aquatic fungi.