
Multi-scale study of the potential of phototrophic biofilms as functional indicators of small streams ecological state in agricultural areas: from watershed to micro-habitat

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Abstract

Headwaters account for nearly 80% of the total river system. However, their functioning remains largely under-studied in comparison with large rivers, the latter being regularly monitored under the Water Framework Directive.

In small streams, phototrophic biofilms provide essential ecological functions and appear as relevant indicators of the ecological health of these aquatic ecosystems. The AQUAFUN project proposes to understand the role of biofilms as a functional indicator by combining three complementary approaches allowing a spatial scaling up from the biofilm micro-habitat to the watershed.

Firstly, a GIS approach will be used to characterize on a regional scale (Lorraine) anthropogenic pressures (land use and hydromorphology) on a large number of small watersheds (< 50 km²). A second stream-scale approach will compare inter- and intra-site variability of the biofilm response as a functional indicator of these small streams. Finally, a high spatial resolution imaging approach (CLSM, AFM) will be conducted at the scale of the biofilm in order to characterize the link between its functioning and its microscale physical structure.

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