University of Antwerp
Faculty of Science

ECOSPHERE

The ECOSPHERE research group aims to study aquatic and valley ecosystems that are continuously challenged by natural and anthropogenic stressors. The research focuses on acquiring fundamental and applied knowledge at different levels of structural and functional organisation in order to underpin environmental management decisions.

MASTER THESIS SUBJECT 2024

Response of aquatic organisms to metal pollution in Flemish streams: a comparison between diatoms and macro-invertebrates

Research group: ECOSPHERE

Hosting laboratory: Meise Botanic Garden

Promotor(s): Prof. Dr Lieven Bervoets & Prof. Dr Bart Van de Vijver

Daily supervision: Mrs Myriam de Haan

View of the Dommel, a small lowland river on the border between Flanders and the Netherlands, impacted by metal pollution

- **This topic mostly contains ☒ literature study, ☒ lab work, ☒ field work, ☐ experimental work, ☐ GIS, ☐ numerical modelling, ☐ other: ……**
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The European Water Framework Directive (WFD) of 2000, requests that all EU member states perform water quality assessment based on biological, physical- chemical and hydro-morphological elements. The biological monitoring includes besides fish fauna and macrophytes, also macroinvertebrates and benthic diatoms. Both groups have already proven to be quite reliable bioindicators for general water quality monitoring and biological indices for both macroinvertebrates and diatoms have been adjusted to comply with the guidelines of the WFD.

In Flanders, both systems are currently being used since more than 15 years in a regular monitoring of the quality of our rivers. The results show that organic, salinity and nutrient pollution lead to significant changes in the species composition for both the macro-invertebrates and the diatoms. The past years, other important pollution types, such as pesticides and metals, gained more and more interest as environmental factors determining and deteriorating the composition of aquatic ecosystems.

In 2006-2007 and 2019-2020, comparative studies were performed on the water quality of the Dommel, a small lowland river on the border between Flanders and the Netherlands, impacted by heavy metals. These studies showed a gradual decrease of the effects mowing away from the most polluted sites. However, this stream is mainly polluted by cadmium and zinc. No comparative studies have been performed on streams polluted with other metals or other micro pollutants. Therefore, a new study is proposed to evaluate and discuss in more detail the impact of different metals (and optional other micro pollutants) on both macroinvertebrates and diatoms at different polluted sites in small streams in Flanders. Changes in community composition due to pollution are evaluated by means of the application of multivariate statistical analyses using cluster analysis and ordination techniques.

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