

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 2025

Refining of the ecological preferences of diatoms based on historic and recent collections

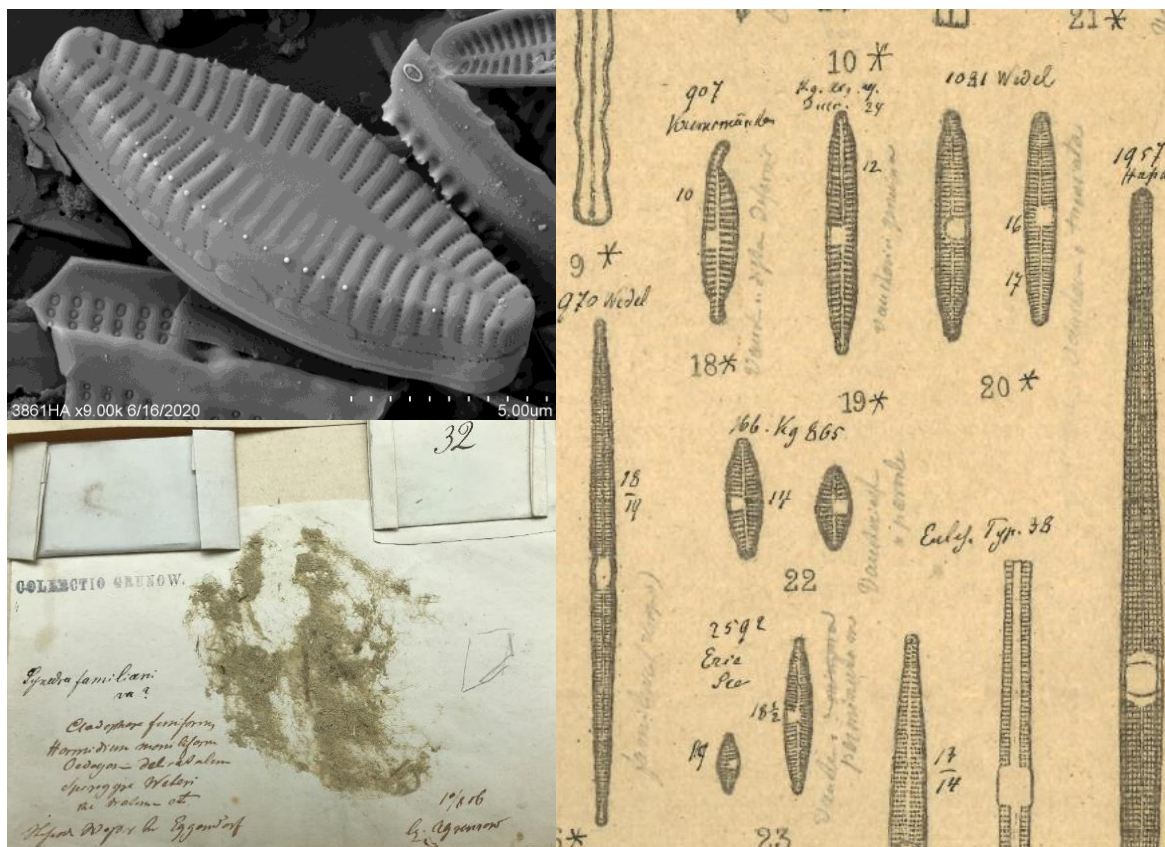
Research group: ECOSPHERE

Hosting laboratory: Meise Botanic Garden

Promotor: Prof. Dr Bart Van de Vijver

Co-promotor: Mrs Margaux Pottiez

Daily supervision: Mrs Myriam de Haan



Three images highlighting the historic work on the genus *Fragilaria*: A SEM picture of *Fragilaria rinoi*, a historic sample from the Grunow collection in Vienna and the annotated version of the 1880 Van Heurck Atlas of the Diatoms

- This topic mostly contains literature study, lab work, field work, experimental work, GIS, numerical modelling, other:
- Possession of driver's license B is needed, recommended, not needed
- Possession of certificates needed: FELASA C, other:



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. This biological monitoring includes fish fauna, macrophytes, macroinvertebrates and benthic diatoms. The latter have already proven to be very reliable bioindicators for general water quality monitoring which led to biological indices being adjusted to comply with the guidelines of the WFD.

The monitoring systems are continuously improved following updates in species identification and definition of ecological profiles. The past 3 years, one of the dominant diatom groups in our rivers and lakes, the genus *Fragilaria*, has been the subject of important revisions, increasing the number of recorded species in Europe from 20 to more than 60. A lot of these species had been previously described in the nineteenth century but were later lumped into morphologically broad complexes. Several of these complexes showed (too) broad ecological preferences, resulting, when present in the samples, in less confident water quality results, making them thus useless as bio-indicators.

Unfortunately, for most of the historic type material, the ecological data are lacking making it impossible to know what environmental features characterize these species.

This thesis aims to fill this gap in our knowledge in combining, based on detailed morphological observations, the original historic data with modern-day populations. That way, we will attempt to determine the ecological preferences for most of these *Fragilaria* species. The diatom assemblages in the type material of several species will be identified. Additionally, a similar analysis will be made of modern-day samples where these species were also recorded. As for these samples, the ecological parameters have been measured, multivariate analysis will allow to compare and connect the historic populations with the modern ones and as a result, the ecological preferences for the present species can be refined.

This proposal does not include field work. All samples have been collected from historic herbaria during a previous water monitoring campaigns in Belgium and Europe. A substantial part of the research will involve microscopical analysis.

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