

*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 2023

Title: Algae facilitated vegetation establishment in tidal marshes

Research group: ECOSPHERE

Hosting laboratory: Campus Drie Eiken, Antwerp

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Tidal marshes, which are ecosystems naturally occurring along the shorelines of estuaries (=tidal rivers), have often been degraded in the past by human conversion of marshes to human land use (e.g. agricultural fields), by construction of dikes that prevent tidal flooding. More recently, tidal marsh restoration efforts have been increasingly undertaken to profit from ecosystem services such as flood protection, carbon sequestration, and habitat provision. Tidal marsh restoration is then realized by re-introduction of the tides on the previously drained agricultural land. However, it is a complex process involving the interaction of hydrodynamic forces (tides and waves), sediment dynamics (sedimentation and erosion), and biological factors (colonization by algae, plants and animals that are tolerant to the tidal inundation). This complexity presents a challenge when attempting to predict the timing and manner in which tidal marshes will develop.



Aerial picture of the Hedwige-Prosper polder.

- 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:



Algae are typical pioneers of bare intertidal sediment surfaces and can contribute significantly to the bio-geomorphological development of the ecosystem. For example, they can increase the sediment strength, thereby increasing the sediment resistance against erosion and stabilizing the sediment. Furthermore, they can trap sediments, thereby elevating the sediment surface elevation and creating a micro-topography that is favorable for vegetation establishment. This thesis will dive deeper into the interplay between sediments, algae and vegetation establishment, aiming to address critical questions about seed entrapment by algae, algal-facilitated seed germination cues, and effects of algae on the survival and growth of young seedlings. As such this thesis will contribute to increase our understanding of the early development of new tidal marsh restoration projects.

Fieldwork will include visit(s) to the Hedwige-Prosper Polder, a newly restored tidal marsh, providing valuable insights into the ecosystem and the ongoing restoration project. The main practical work will be experiments conducted either in the field site or within the controlled environment of a tidal Mesocosm facility, or a combination of both.

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