

*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 2026-2027

Restoring species-rich forests and woodland fringes

Research group: ECOSPHERE

Hosting laboratory: CDE, building C

Promotor(s): prof. Tobias Ceulemans – tobias.ceulemans@uantwerpen.be

Daily supervision:



Melampyro-Holcetea mollis fringe. Photo: Industrees, Wikimedia Commons (CC0).

- 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:

Summary

Dense stands dominated by invasive sweet chestnut (*Castanea sativa*) and northern red oak (*Quercus rubra*) are the starting point for this forest restoration experiment. The objective is to restore species-rich woodland towards habitat 9120, the acidophilous oak–beech forests protected under the EU Habitats Directive, together with well-developed woodland fringes of the vegetation class *Melampyro-Holcetea mollis*. The thesis forms part of the European LIFE HARWIN nature restoration project that established large-scale field experiments covering more than 15 ha at Chartreuzenbos (Holsbeek), Troostenberg (Tielt-Winge), and Beninksberg and Wijngaardberg (Rotselaar). To our knowledge, this is the first comparative study of this scale in Flanders targeting the restoration of forests dominated by invasive alien trees.

The experiment compares three methods targeting *Castanea sativa* and *Quercus rubra*: (1) uprooting young regeneration and girdling older trees; (2) felling the invasive trees and removing the litter layer containing their seedlings with an excavator; and (3) the same felling and litter removal followed by milling the upper forest soil to test whether additional disturbance suppresses remaining seedlings. Each method is combined with planting native tree stock or allowing spontaneous regeneration, and with sowing target *Melampyro-Holcetea mollis* species or leaving plots unsown. These three factors yield twelve treatment combinations. Native tree establishment will be assessed, including species such as aspen (*Populus tremula*), small-leaved lime (*Tilia cordata*) and hornbeam (*Carpinus betulus*). The student will map the experimental treatment areas and permanent sampling locations in GIS, documenting plot boundaries, treatment histories and spatial replication.

The student will review the literature and monitor vegetation development, native tree establishment and renewed recruitment or resprouting of the invasive trees. Repeated vegetation surveys will quantify target species establishment, species richness and composition, alongside indicators of habitat structure and local conservation condition relevant to habitat 9120 and species-rich woodland fringes. Standardised surveys of selected invertebrate groups and characteristic fungi surveys will assess associated biodiversity responses. Litter cover, soil disturbance, light conditions, dead wood and soil analyses will help interpret treatment effects. Analyses will respect the experimental plot, block and site structure, and assess interactions between invasive-tree removal, planting and sowing. The goal is to identify effective restoration pathways and possible trade-offs between invasion control and ecosystem recovery. The thesis will provide an early assessment within a longer-term trajectory towards favourable conservation status. This topic is intended for MSc Biology students specialising in Biodiversity, Conservation and Restoration, with a strong interest in woodland plants, invertebrates and fungi. A category B driving licence is required.



Species-rich woodland fringe with the endangered Serratula tinctoria, Hieracium sabaudum and Solidago virgaurea from right to left. (Photo: Tobias Ceulemans)