

The Research Group

Ecology and Biodiversity

has the honor to invite you to the public defense of the PhD thesis of

Abrehet Kahsay Mehari

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:
Ecological State of Tropical Wetlands Under Different Human Disturbances (Lake Tana, Ethiopia)

Promotors:

Prof. dr. Iris Stiers (VUB)

Em. Prof. dr. Ludwig Triest (ULB)

Dr. Pieter Lemmens (KULeuven)

Dr. Ayalew Wondie (Bahir Dar University)

Prof. dr. Luc Leyns (VUB)

The defense will take place on

Tuesday, June 20, 2023, at 16:00h

in D2.01 at Vrije Universiteit Brussel,
Pleinlaan 2, 1050 Elsene

The defense can also be followed through a
live stream (link available on request)

Members of the jury

Prof. dr. Bram Vanschoenwinkel (VUB, chair)

Prof. dr. Kristien Brans (VUB, secretary)

Prof. dr. Dominique Maes (VUB)

Dr. Stijn Van Onsem (Vlaamse Milieumaatschappij)

Dr. Alain De Vocht (Universiteit Hasselt)

Curriculum vitae

Abrehet Kahsay (° 1985) obtained her BSc degree in Fisheries, Wetlands and Wildlife Management from Bahir Dar University (Ethiopia) in 2008 and MSc degree in Fisheries and Wetlands Management from Bahir Dar University in 2011. In 2018, she was awarded a VLIR-IUC scholarship for her doctoral study in the Ecology and Biodiversity laboratory of the VUB and Bahir Dar University of Ethiopia. During her PhD study, Abrehet published two peer-reviewed papers, as a first author, in international journals. She attended national and international workshops and supervised MSc theses. She also delivered oral presentations at international conferences.

Her research area of interests includes wetlands ecology, remote sensing of wetlands, wetland restoration, artificial wetlands.

Abstract of the PhD research

Wetlands have become the world's most degraded ecosystems. Land-use changes have been identified as the primary wetland change drivers worldwide. Currently, these land use changes are particularly pervasive in tropics, given economic development dynamics in these often low- and middle-income regions. As a result, more than half of all known freshwater wetlands have been destroyed globally, with further losses of tropical wetlands projected. Despite this, information on the ecological state of the world's remaining wetlands, notably tropical wetlands, is scarce. When compared to temperate regions, our understanding of tropical wetland biodiversity is poor. The lack of a solid understanding of the ecological state of tropical wetlands limits our ability to sustainably manage and conserve these ecosystems.

Therefore, this study is conducted to better understand the ecological states of tropical wetlands under different human disturbances (Lake Tana, Ethiopia). We estimated how the spatial distribution and size of papyrus swamps in the Lake Tana region changed between 1985 and 2020. This study shows that the last 35 years have seen a 55% decrease in the total surface area of papyrus swamps, primarily due to agricultural expansion. This study also found that human disturbances at the wetlands level increased turbidity, decreased water levels, and reduced aquatic plant and plankton species diversity. Different wetland types with varying human disturbances and hydrological conditions in the area have different aquatic plant and plankton community compositions. In contrast to less degraded riverine papyrus swamps and lacustrine wetlands, which are dominated by sedge species, highly degraded river mouth wetlands are dominated by grass species, annual alien weeds, and highland species. It was also found that phytoplankton communities in river mouth wetlands were dominated by Bacillariophyta, whereas Chlorophyta dominated those of lacustrine wetlands. The zooplankton community in the wetlands surrounding Lake Tana are generally dominated by rotifers. In a mesocosm experiment, however, moderate sediment burial depth stimulated *Cyperus papyrus*, the foundation species in Lake Tana wetlands. *Cyperus papyrus* also has shown great potential in the treatment of municipal wastewater in artificial wetlands. Protecting *Cyperus papyrus*-dominated swamps and (where possible) revegetating highly degraded wetlands with *Cyperus papyrus* should thus be a cornerstone of catchment management strategies in the Lake sub-basin.