PEAT EATERS MATTER!

WP2.1 The role of microorganisms in land subsidence

Duygu Tolunay[1], Gilles Erkens[1,2,3]George A. Kowalchuk[1], Mariet M. Hefting[4]

1Ecology & Biodiversity, Institute of Environmental Biology, Utrecht University, Padualaan 8, 3584 CH Utrecht, The Netherlands
2Department of Physical Geography, Utrecht University, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands
3Deltares Research Institute, Daltonlaan 600, 3584 BK Utrecht, The Netherlands
4Systems Ecology, Institute for Life and Environment, Vrij Universiteit Amsterdam, De Boelelaan 1085, 1081HV Amsterdam, The Netherlands

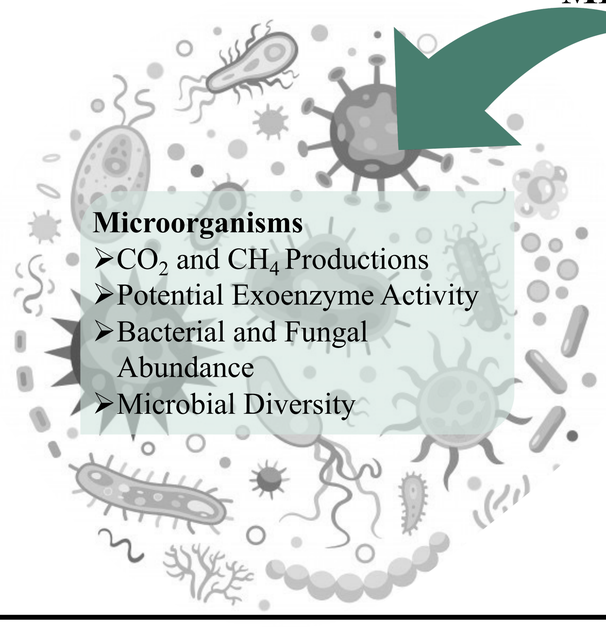
d.tolunay@uu.nl

FOCUS

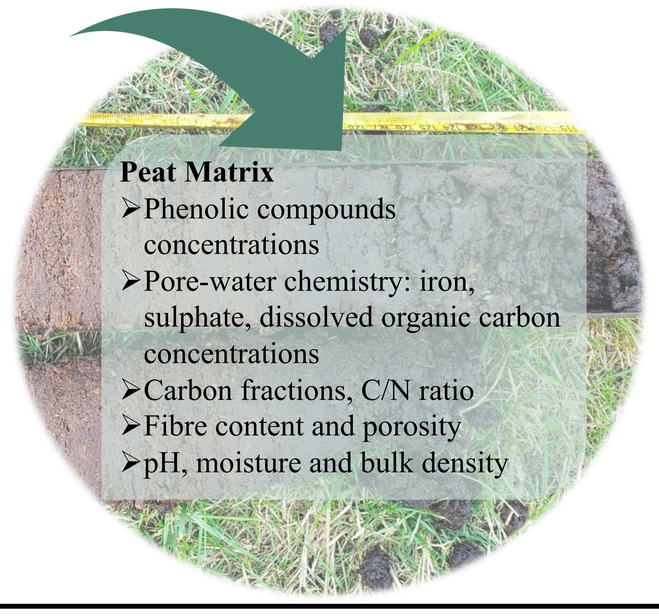
RESEARCH GOALS

- Determining the diversity in aerobic and anaerobic decomposition rates in Dutch peatlands
- Revealing the major drivers of decomposition rates in Dutch peatlands
  - ✓ Microbial community
  - ✓ Substrate
  - ✓ Pore-water chemistry
- Understanding the interaction of biological and physical land subsidence mechanisms

METHODOLOGY



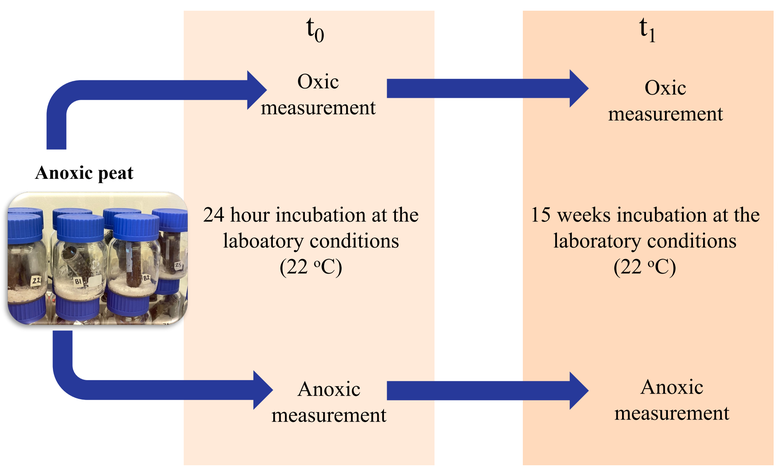
Microorganisms
- CO_2 and CH_4 Productions
- Potential Exoenzyme Activity
- Bacterial and Fungal Abundance
- Microbial Diversity



Peat Matrix
- Phenolic compounds concentrations
- Pore-water chemistry: iron, sulphate, dissolved organic carbon concentrations
- Carbon fractions, C/N ratio
- Fibre content and porosity
- pH, moisture and bulk density

RESEARCH QUESTIONS

RQ.1 What are the aerobic and anaerobic decomposition rates in botanically different peatlands in the Netherlands?



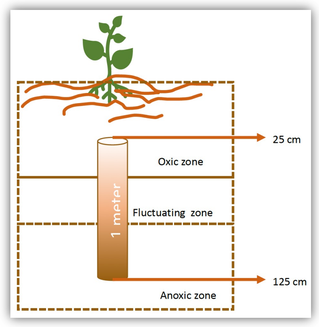
Decomposition rates in Dutch peatlands

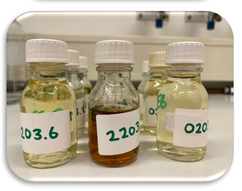
Drivers: Pore-water chemistry

RQ.2 How does substrate legacy impact microbial activity, diversity and abundance in Dutch peatlands when environmental conditions are changed?

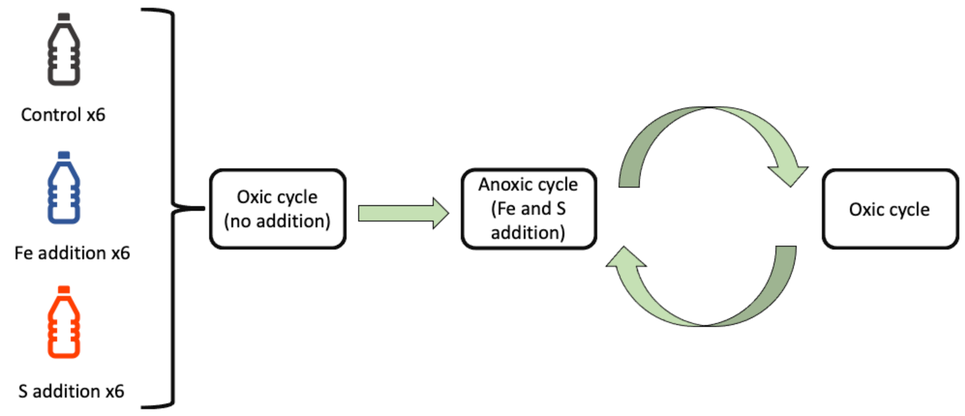
Drivers: Substrate legacy

Interaction: Microbial activity and compaction

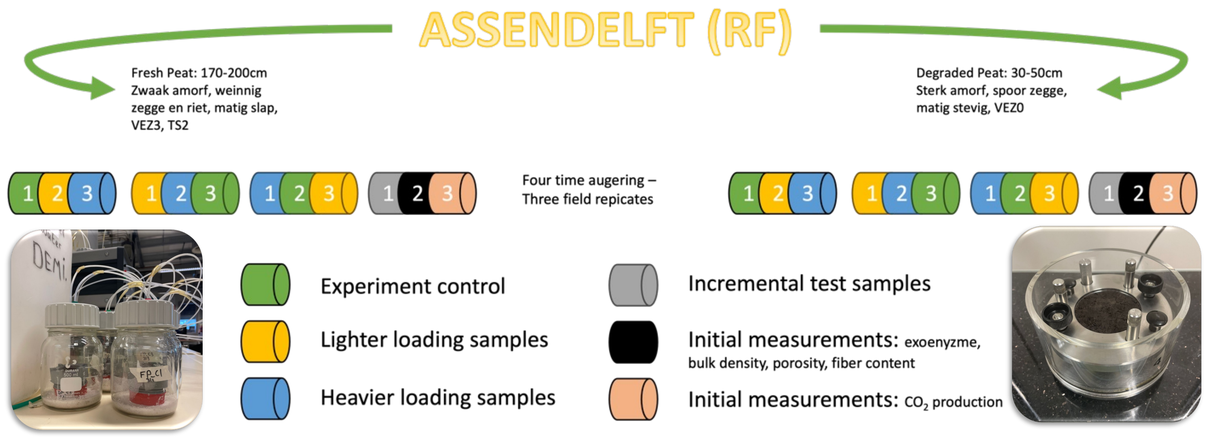




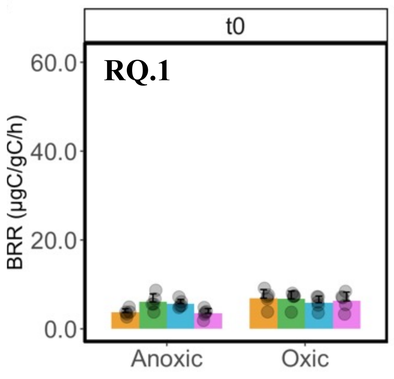
RQ.3 What is the effect of sulphur and iron presence on aerobic and anaerobic microbial activitiy?

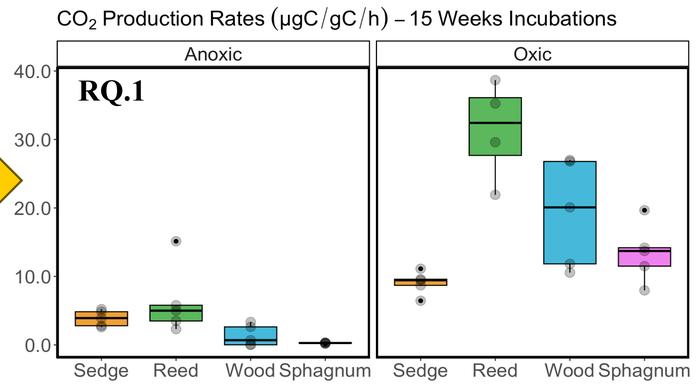


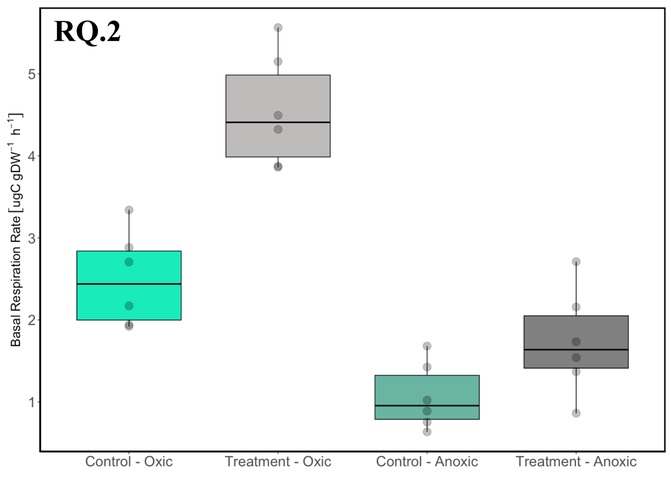
RQ.4 How do variations in porosity and pore interconnectedness influence microbial activity in both degraded and fresh peat samples?

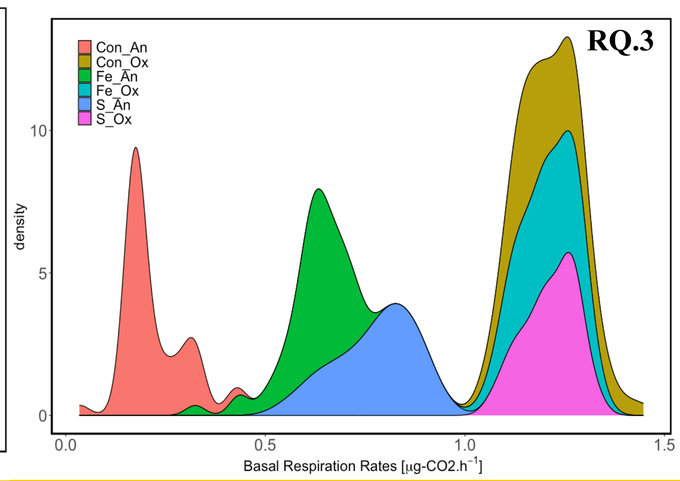


RESULTS & CONCLUSIONS









TAKE-HOME MESSAGES

- Microorganisms degrade peat in both **water-saturated** (anoxic) and **drained** (oxic) peat layers causing land subsidence.
- **Types of plants** that form peat affects how fast it decomposes.
- Changes in the **chemistry of water in the pores** affect decomposition rates, leading to changes in land subsidence.
- Presence of **sulphur** and **iron** in peatlands speeds up the decomposition of peat by microorganisms.
- The time required to **restore peatlands** after **rewetting** varies depending on the availability of **substrates** and **the chemistry of water**. As a result, restoration time can differ across various peat areas.

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For more information: https://nwa-loss.nl/