Influence of grass invasion on soil parameters in a Belgian heathland

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Introduction

- N deposition
- Heather thrives on nutrient poor soils → now outcompeted by subdominant species: grass, better suited to these elevated N levels
- Heather (vs grass): woody litter → lignin → harder to degrade → slows down N cycle

Hypothesis: lower nutrient turnover in heathland compared to grassland → impact on soil nutrient cycling

Figure 1. Grass invaded heathland

Method

- 14 Plots
  - ➢ grass gradient

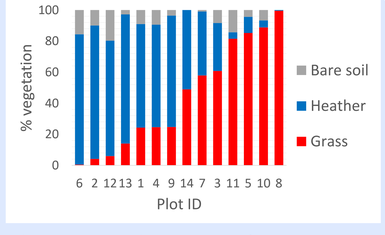


Figure 2. Vegetation cover per plot

- Measurement of:

Vegetation cover
Root biomass
Soil water content
N net mineralization rate (NMR)
Relative nitrification
Enzymes: chitinase & phosphatase
Total C & total N

Results

A

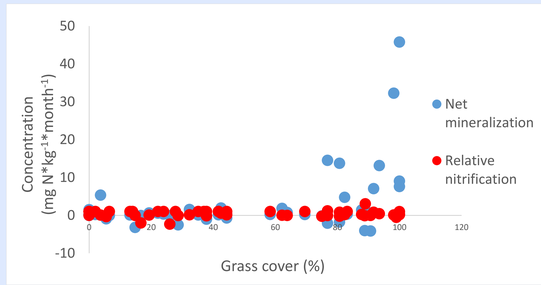


Figure 3. Effect of vegetation on N turnover

- No significant correlation
  → vegetation has no impact on measured parameters
- Nonlinear trend: high NMR at threshold value of approximately 70% grass
  → effect when vegetation is truly dominant

B

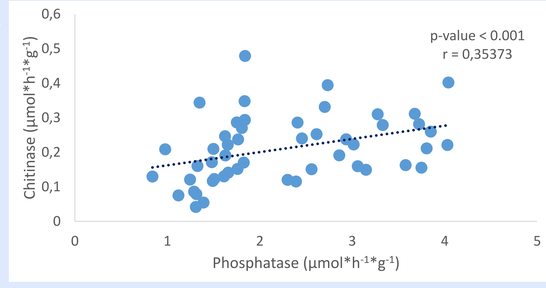


Figure 4. Correlation of phosphatase & chitinase

The data show significant correlations between
Chitinase & phosphatase
→ Tightly coupled N & P cycles

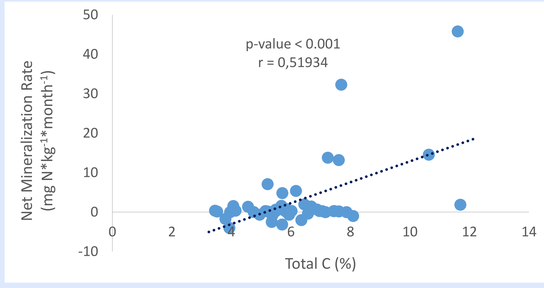
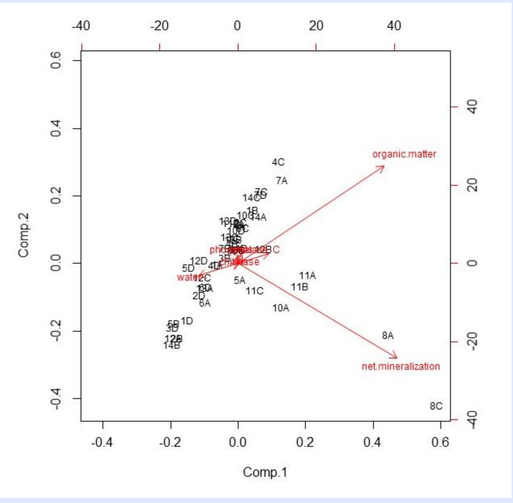


Figure 5. Correlation total C & net mineralization rate

Total C & NMR
→ NMR = conversion of organic matter to NH_4
→ OM ↑ → NMR ↑ → C ↑

C



Nos = plot number

Letters = Biological Replicate (a, b, c & d)

Graph = scaled & centered

Figure 6. PCA of variables in function of different plots with grass gradient

2 components represents 85% of the total variation in the data:
Component 1: 62,2%
Component 2: 23,8%

Organic matter & NMR contribute most to dataset (positive association)

Most points=clustered, outliers: sample 8A, 10A, 11A, 11B, 4C, 7A (Total samples n=56)

Conclusions

- The study shows
  - ➢ no impact of grass invasion on these parameters measured in the heathland
  - ➢ organic matter & NMR show an influence on the data
  - ➢ dominant vegetation → effect of litter
- Further research is needed to understand how to maintain ecosystem

Acknowledgements

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