# Moderate grazing intensity enhances regrowth without altering spatial heterogeneity in a perennial ryegrass pasture

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## Introduction

- Grazing creates heterogeneity
- Heterogeneity affects intake efficiency and plant regrowth
- Low post-grazing heights may limit pasture recovery

## Objectives

Evaluate the effect of grazing intensity (GI) on structural heterogeneity and post-grazing regrowth.

## Materials and Methods

### Experimental design

Spring - summer 2022, Gembloux (Belgium),

1.1 ha of *Lolium perenne*

20 paddocks (180 m²), Occupation time (3 days).

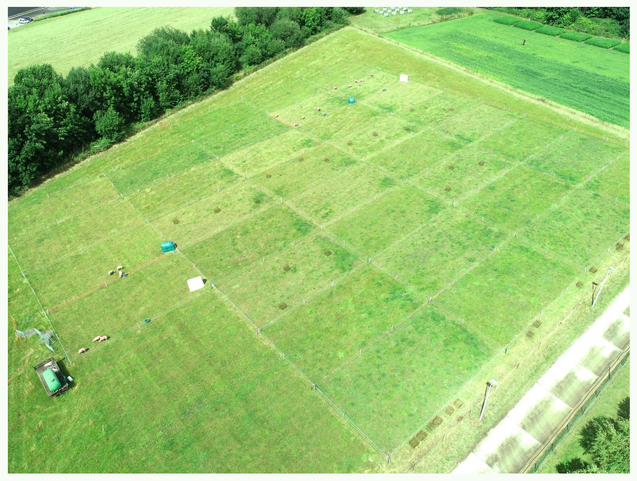
2 full grazing cycles

### Measurements

Sward height (40 points)

UAV-based NDVI (1.4 cm resolution)

Moran's I and semivariogram parameters



### Statistical analysis

GLMM, treatment as fixed effects, paddock as random factor.

### Two treatments

T1 (low GI): 25% reduction, 12 cm → 9 cm (3 sheep)

T2 (moderate GI): 50% reduction, 12 cm → 6 cm (6 sheep)

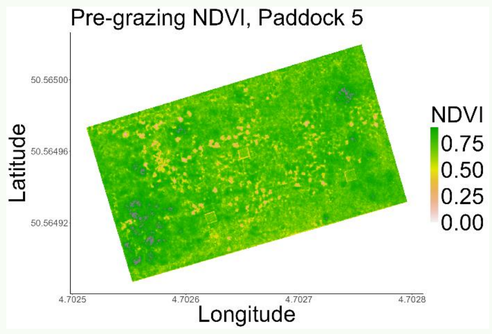
## Results

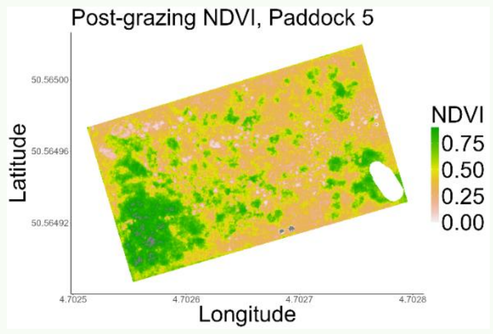
### Biomass removal

- No pre-grazing difference between treatments
- NDVI decreased after grazing in both treatments
- Greater decline under moderate GI (T2)

→ Higher biomass removal under moderate GI

NDVI pre- vs post-grazing (P5, C2, T2)




### Structural heterogeneity

- Grazing increased spatial heterogeneity ($P < 0.01$)
- Higher semivariogram sill after grazing
- No effect of grazing intensity

→ Similar heterogeneity across GI

Semivariogram sill (Co + C)

| | Cycle 1 | | Cycle 2 | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| T1 | 0.005 | 0.011 | 0.004 | 0.012 |
| T2 | 0.007 | 0.015 | 0.006 | 0.026 |

### Regrowth

Cycle 1 (C1): higher regrowth under low GI (trend)

Cycle 2 (C2): higher regrowth under moderate GI ($P = 0.02$)

→ In C2, low GI: older leaf tissues and reproductive growth, reducing regrowth

Average regrowth rate in cm day$^{-1}$

| Cycle | Treatment 1 | Treatment 2 | P value |
|---|---|---|---|
| C1 | 0.23 ± 0.16 | 0.10 ± 0.08 | 0.069 |
| C2 | 0.08 ± 0.08 | 0.16 ± 0.07 | 0.02 |

## Conclusion

Moderate grazing increased biomass removal while maintaining structural heterogeneity and enhancing regrowth in the second cycle, indicating improved pasture utilization.

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