







Grazing and mowing impact on soil organic carbon and microbial activity in grassland soil

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Soil disturbance in grasslands due to land use management can be defined by:

- Frequency of destructive events
- The intensity of anthropogenic pressure
- The nature of perturbation



Area under permanent grassland

Grassland practices

- Plant species
- Fertilisation (inorganic/organic)
- Irrigation practices
- Harvesting management (mowing/grazing)

Introduction

Experimental site of Theix – France is a part of a long-term observatory for environmental research (Agroecosystems, Biogeochemical Cycles and Biodiversity, SOERE–ACBB; http://www.soere-acbb.com) set-up in 2005.

Treatments

- 1. Abandoned
- 2. Mowing with NPK fertilisation
- 3. Low intensity grazing \rightarrow 0.7 AU/ha
- 4. High intensity grazing → 1.46 AU/ha
- 5. Bare





Mowing system is a pasture where grass is cut and carried out to cowshed







Soil:

We sampled topsoil (0-10 cm) at 2 plot replicates + 3 field replicates (N=6)

Objective:

to estimate how grazing and mowing affect SOC chemical characteristics and its link with microbial activity

SOM properties

- SOC and N contents
- Lignin content
- Amino sugars content

Microbial activity

- Microbial biomass C
- Microbial growth kinetics parameters
- 7 enzymes activities

Will studied parameters be sensitive to disturbance gradient?





SOC and N content





Lowest C:N ratio under High intensity grazing and bare soil

SOM properties

Lignin content and lignin degradation state



Absolute lignin content followed the pattern of C content. Although, lignin content per SOC did not show any differences between treatments.

Higher degraded lignin under Mowing compared to Grazing treatments



Amino sugars content did not differ among the grassland managements. There was only difference between abandoned site and bare soil

The absence of management decreased Glucosamine to Galactosamine ratio

Basal respiration and metabolic quotient



Basal respiration under High intensity grazing was higher compared to Low intensity grazing

Metabolic quotient did not differ between grassland practices and abandoned site.

Basal respiration and metabolic quotient



Highest MBC under Abandoned and High intensity grazing whereas similarly lower MBC under Low intensity grazing and Mowing Highest percentage of active MBC was found under High intensity grazing. K-strategists prevailed under High intensity grazing whereas Low intensity grazing and Mowing favored r-strategists

Enzyme activities



Absolute enzyme activities followed the pattern of SOC content

Enzyme activities per MBC were highest under Low intensity grazing and Bare soil (except for leucin aminopeptidase)

				ls SON	SOM properties			Conclusions
	lant input		Plant input	Dung input/ fertilisation	Microbial component	SO	M	
	Unmana	Unmanaged				2 → continuos plant input which stimalates microbial activity		
	Low intensity grazing			╞	╉	1 HIGHEST → synergism of 3 components		
	High integrazir	High intensity grazingImage: Constraint of the second sec				2 →d plan	ung and microbe activity co nt input and kept SOC incre	mpensated natural asing
	Mowin			₽	╉	<pre>4</pre>		
	Bare				4-	5 I →1	LOWEST no input	
3		7 May 201	20					