



15<sup>th</sup> Meeting of the FAO-CIHEAM Mountain Pastures  
**Integrated research for the sustainability of mountain pastures**

**Links between forage systems, practices  
and biodiversity:**

**an approach in a PDO cheese area  
in French mountains.**

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**BIG-Diva project** : how local actors adopt or not the stake of safeguarding biodiversity, and convey it into actions in PDO cheese areas.

- ♦ Part of Diva program : “Agriculture, action publique et biodiversité” French ministry of ecology.
- ♦ A multidisciplinary approach : agronomists, ecologists, economists

**Biodiversity present, produced and used by the dairy farms of a PDO cheese area in Auvergne (France).**

- ♦ Combining of different analysis scales :
  - **Area, farm, plot, vegetation facies**
  - **Farming and forage systems, practices sequences, biodiversity**
- ♦ Two PDO cheese areas surveyed : Saint Nectaire, Salers

→ The first results for the Saint-Nectaire PDO cheese



## The Saint Nectaire PDO area

### A mountain area :

- 1900km<sup>2</sup>
- 800-1800 m elevation
- Mainly grassland systems



### Saint-Nectaire PDO cheese :

- 921 dairy farms
- the 5th rank of the 29 French PDO cheeses
- about 45% of total tonnage is made in farms by breeders



### The specifications for this PDO cheese will change (2015-2020) :

- no maize, no damp forage
- 90 % permanent pastures, grass diet only from the PDO area
- all cows have to be born and bred in the PDO area

## Material and methods

### ➔ A statistical analysis of the fodder systems in the PDO area

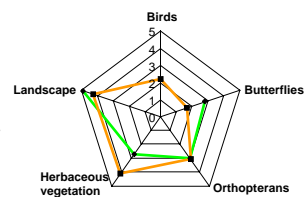
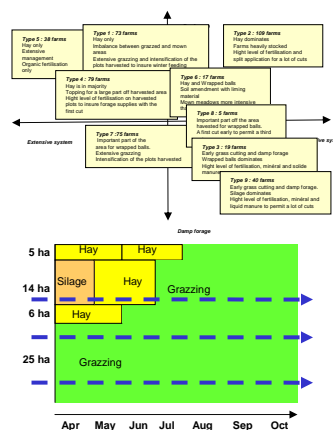
- characteristics of the fodder systems as regards their potential impact on biodiversity
- 18 variables for 455 farms

### ➔ Surveys in dairy farms

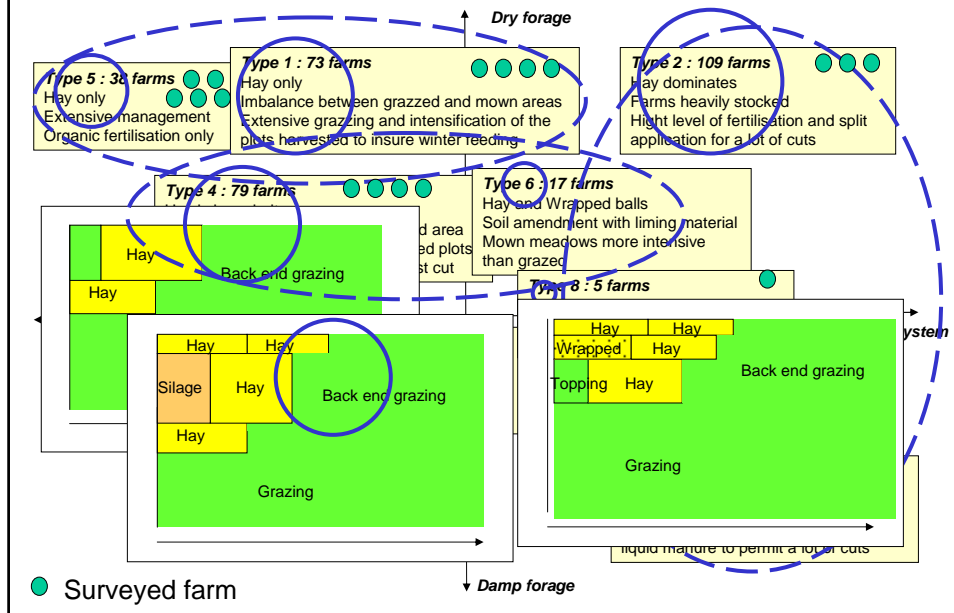
- 20 farms surveyed all over the area
- description of the fodder system and the main practices
- links with the livestock system

### ➔ A simplified assessment of floristic and faunistic diversity

- Three plots for each farm surveyed :
- two typical plots of the farming system : one only grazed, one mown
  - the most diversified one according to the farmer

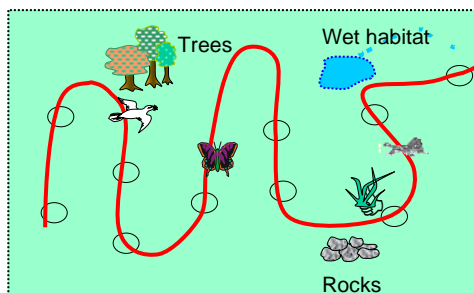


## Results 1 : Typology of the forage systems



## Biodiversity assessment

A simplified method based on **field observations** :



- **Landscape elements**

- **Fauna counts** : size, colour, individuals...

- **Flora counts** : colours, flowers, physiognomy...

Indicators ⇒ assessment grids

➡ **Five diversity components** :

- fauna : birds, butterflies, orthopterans *at plot scale*

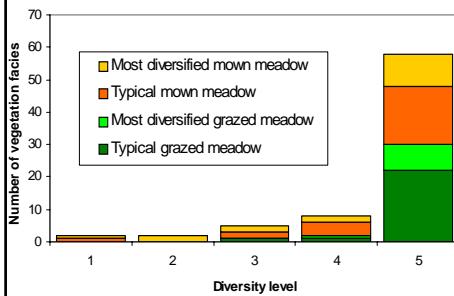
- flora : herbaceous vegetation, landscape elements *at vegetation facies scale*

➡ **Five diversity levels** : 1 (low) to 5 (high) in reference to regional values for different kind of meadows

## Results 2 : Floristic diversity

- 58 plots (1 to 20 ha) ⇒ 75 vegetation facies (33 grazed, 42 mown)

### Diversity of landscape elements



- high level of landscape diversity (mean = 4,6)
- no difference between meadows

### Diversity of herbaceous vegetation



- wide range of diversity levels (mean = 3,6)
- grazed level (3) < mown level (4)
- « most diversified » > typical

## Results 3: Links between the forage system and the herbaceous diversity

Diversity results (herbaceous vegetation) for 3 plots per farm (typical grazed, typical mown and the most diversified plot)

Hypothesis on biodiversity	Positive effect expected		Various effect	Negative effect expected			
	1	5		2	3	8	9
Forage system			4				
Biodiversity results on the 3 plots (one line per farm)	5 5 5 4 2 3 5 5 5 2 5 5 2 3 2 3 4	5 4 5 5 5 5 5 5 4 5 5 4 2 5 5	1 3 2 4 5 3 4 5 5 1 2 2 3 4 5 2	1 3 2 3 2 1 5 1 5	5 3 3 5 3	3 5 3	1 2 5 5 1 3 1 1
		2 3 3 4 3 5					

Diversity levels : 1 low 2 quite low 3 medium 4 quite high 5 high

◆ organic farming systems

→ Trends : high diversity level for extensive systems with dry forage  
lower diversity level for intensive systems

But some exceptions, even for typical plots → discussion with each farmer

### Factors of difference between plot diversity observed and expected

Hypothesis on biodiversity	Positive effect expected		Various effect	Negative effect expected				
Forage system	1		4	2	3	8	9	
Biodiversity results on the 3 plots (one line per farm)	5 5 54	5 4 5 5	3 2 4 5	1 3 2 3	5 3	3 5 3	1 2 5 5	
	2 5 5 5	5 5 5	3 4 5 5	2 1 5			1 3 1	
	2 3 2 3 4	2 5 5	4 5 2					
		2 3 3 4 3 5						

Plot location (near) → Fodder autonomy → History of practices → Wet conditions → Soil heterogeneity → Plot location (far) and topography → Diversity between and within plots

### Discussion and conclusions

#### → Floristic diversity in the Saint Nectaire PDO dairy systems

No exhaustive results (20 farms, 3 plots/farm) but main trends

- ❖ **Herbaceous vegetation** : medium level with high variability due to fodder system (extensive/ intensive) and plot characteristics
- ❖ **Landscape elements** : high level contributes to global floristic diversity

#### → New PDO specifications : which advices to maintain biodiversity ?

- Intensive systems : keep up the **vegetation diversity between plots** (farm scale) and **within plots**
- **Maintain the landscape elements** : biodiversity islands

#### → Biodiversity in the Saint Nectaire PDO area

60 % of dairy systems : biodiversity is also produced by suckling systems