



Role of the between-plot plant functional diversity in uplands dairy farms



Jean-Pierre Theau, Mathilde Piquet, Bibiane Baumont, Christophe Chabaliier, Benoit Delmas, Clémentine Lacour, Sophie Hulin, Anne Farruggia, Pascal Carrère

Introduction



● Context

In upland areas climate or topography structure strongly influence farm systems.

- ✗ need to produce stocks to feed animals during winter season
- ✗ small or medium size structure with a scattered spatial organisation of the plots

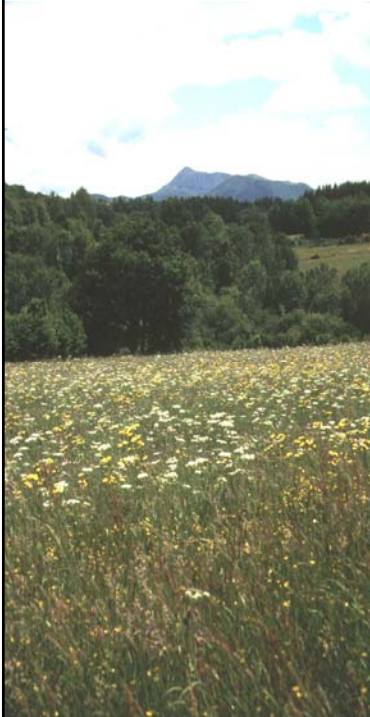
● Issue

✗ Maintaining the economic viability of the farm requires to search **more favourable milk prices and profit margins**


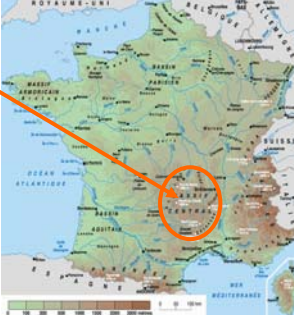
✗ PDO = a good response to this issue + it sets grassland at a key point of the forage system




Introduction



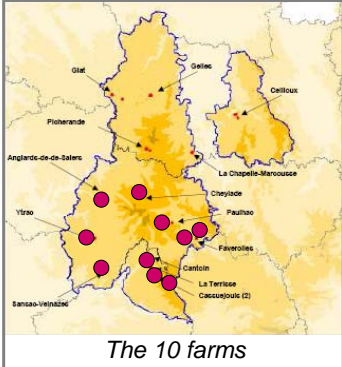
- The question
 - ✗ How can inter-plot diversity of grasslands on the farm be a positive feature in the sustainability of dairy systems ?
- The program
 - ✗ Research-Development project
- Area and Process of the study
 - ✗ Massif Central
 - ⇒ 2 PDOs: “Le Laguiole” and “Le Cantal”
 - ✗ Survey identifying farmers’ practices
 - ✗ Botanic composition to assess the vegetation diversity of the plots


Material & methods



- Areas
 - ✗ Laguiole: 1,900 km², altitude from 700 to 1,300 m, average of 1,300 mm annual rainfall
 - ⇒ 4 farms
 - ✗ Cantal: 7,200 km², altitude from 700 to 1,000 m, 600 mm to 1,600 mm annual rainfall
 - ⇒ 6 farms
- ➡ ● Representative of pedoclimatic variability
- Key figures of the 10 farms:
 - total cultivated area: 38-77 ha,
 - 27-50 dairy cows,
 - calving season: fall-winter,
 - intensification level:
 - 2,800 to 7,300 L/dairy cow
 - 2,400 to 6,500 L/ha of forage area



The 10 farms



Material & methods

• Identification of farmers' practices

× Vegetation survey

- In every plot: contribution of **dominant species** = account for more than 17% of the botanical composition
- according to Cruz et al. 2002, each species ⇨ **functional class**, defined by the dry matter content of blades



	Types	Species (examples)	
+ Phenology + Duration of leaf life + Digestibility at vegetative stage	A	<i>Hoicus lanatus</i>	Productive species
	B	<i>Dactylis</i> sp.	
	b	<i>Agrostis capillaris</i>	Late species
	C	<i>Festuca rubra</i>	
	D	<i>Brachypodium</i> sp.	
E	<i>Lolium multiflorum</i>		

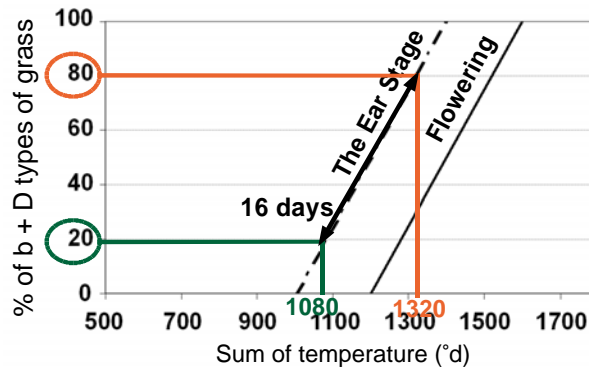
From Ansquer et al., 2004

Material & methods

• Identification of farmers' practices

× Diagnosis of forage practices

- Use phenology to diagnose quality of practices ⇨ mowing and grazing



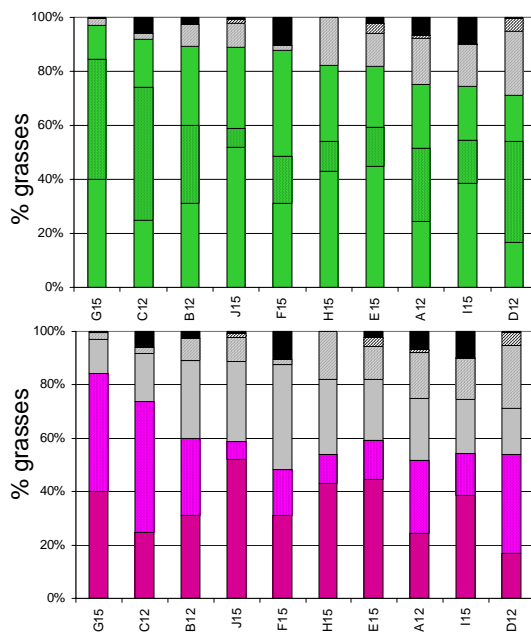
- Comparison of the diagnosis of forage practices to a reference table to estimate the quality of basis ration

Results and discussion

- Figure 1 : Part of each functional type in forage surface
- Figure 2 : Diagnosis of mowing production unit
- Figure 3 : Comparison of mowing and grazing practices with supplying of concentrates



At farm scale, grassland vegetation is diversified, but with a wide range of potential of production...



In each farm, we described 4-6 different functional types that showed a good functional diversity

Productive grasses: 70 to 100 % of A + B + b types

⇒ varied productive potential

Among productive grasses, 50 to 85 % are early flowering species

⇒ varied precocity potential

... flexibility of management and autonomy in uplands farms

Figure 1 : Part of each functional type in forage surface

The functional approach allows a diagnosis of the farmer's practices

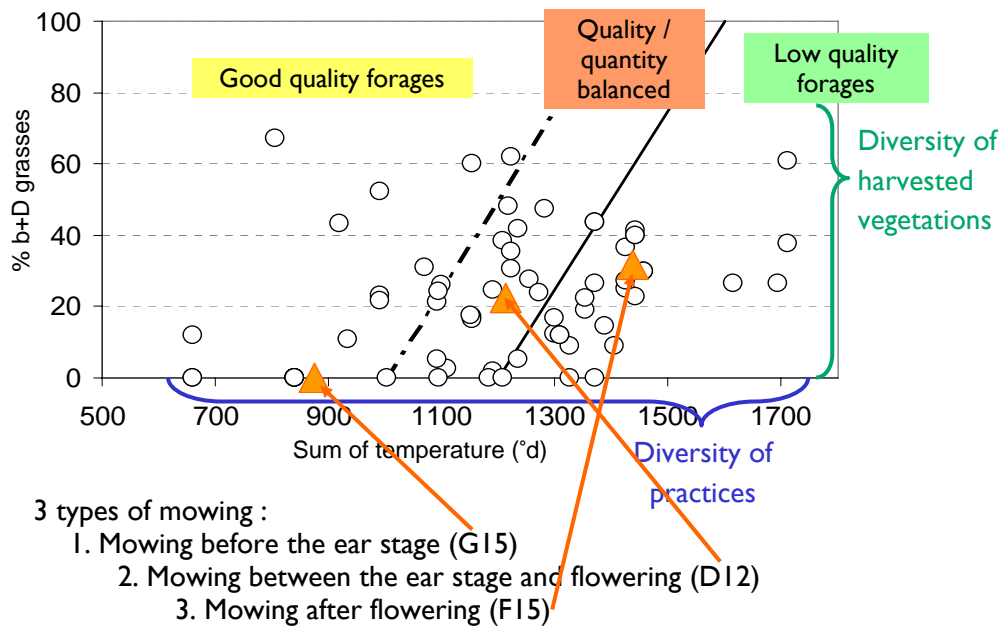


Figure 2 : Diagnosis of mowing production unit

Analysis of the system practices: identifying the part of mowing and grazing practices

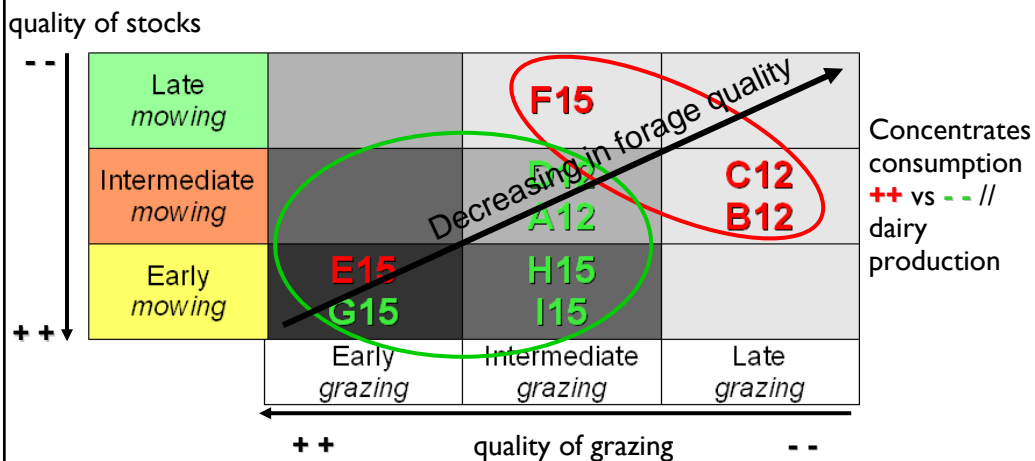
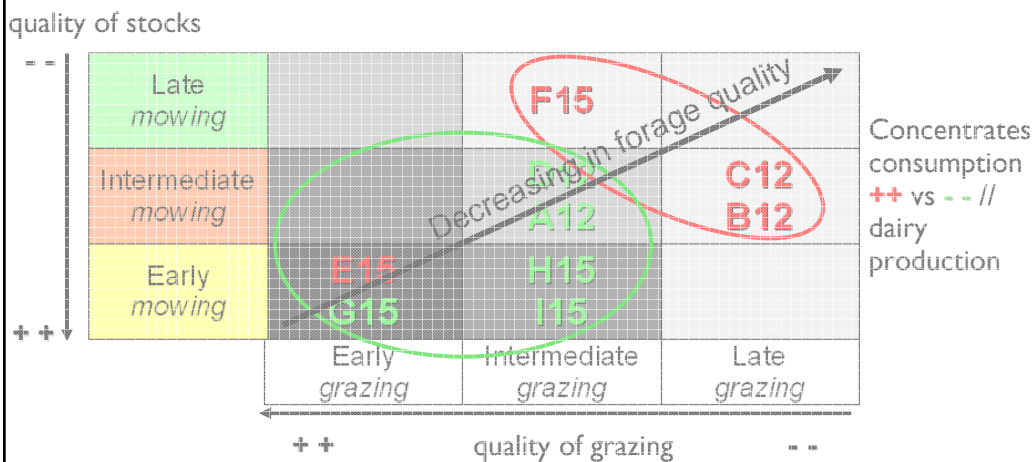


Figure 3 : Comparison of mowing and grazing practices with supplying of concentrates

Analysis of the system practices: identifying the part of mowing and grazing practices



lack of confidence of farmers in their capacity to efficiently manage grazing
⇒ **over consumption** of feeding inputs

⇒ grasslands are poorly managed ... and farms are quite dependent on inputs
⇒ **economic**

Figure 3 : Comparison of mowing and grazing practices with supplying of concentrates

Conclusions

- Our study shows that, in upland farms, forage potential of grasslands is **under-used**
- Reinforcing **confidence** of farmers in their grazing practices will let them to improve **efficiency** of dairy production units
- Such studies have to supply **objective references** to encourage grasslands use which provides **sustainability**



15th Meeting of the FAO-CIHEAM Mountain Pastures Network
Integrated research for the sustainability of mountain pastures

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