



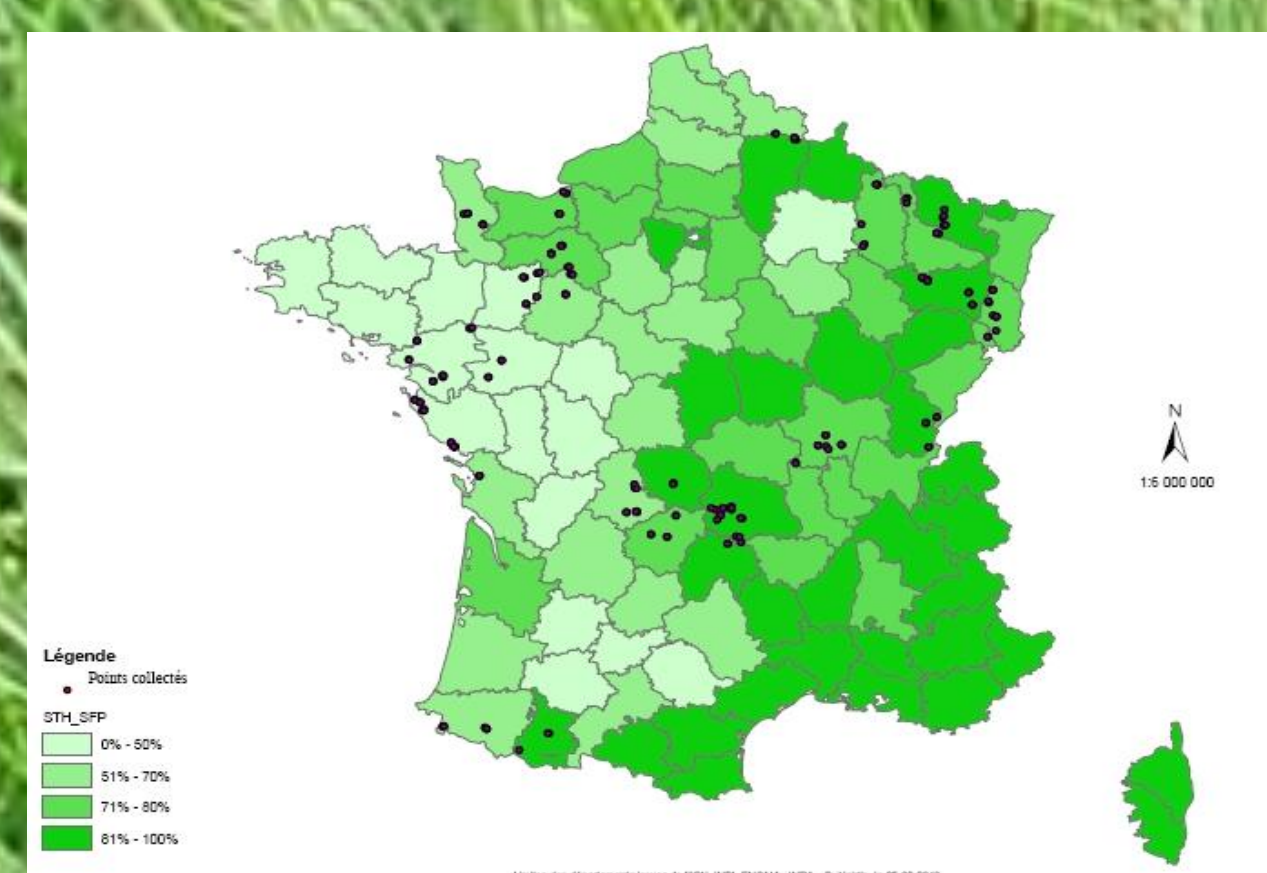
Michaud A.<sup>1,2,3</sup>, Plantureux S.<sup>1</sup>, Baumont R.<sup>2</sup>

(1) Nancy Université - INRA, UMR Agronomie et Environnement, Nancy-Colmar (F), (2) INRA, UR 1213 Herbivores, Clermont-Ferrand/Theix (F), (3) Institut de l'Elevage, Paris (F)

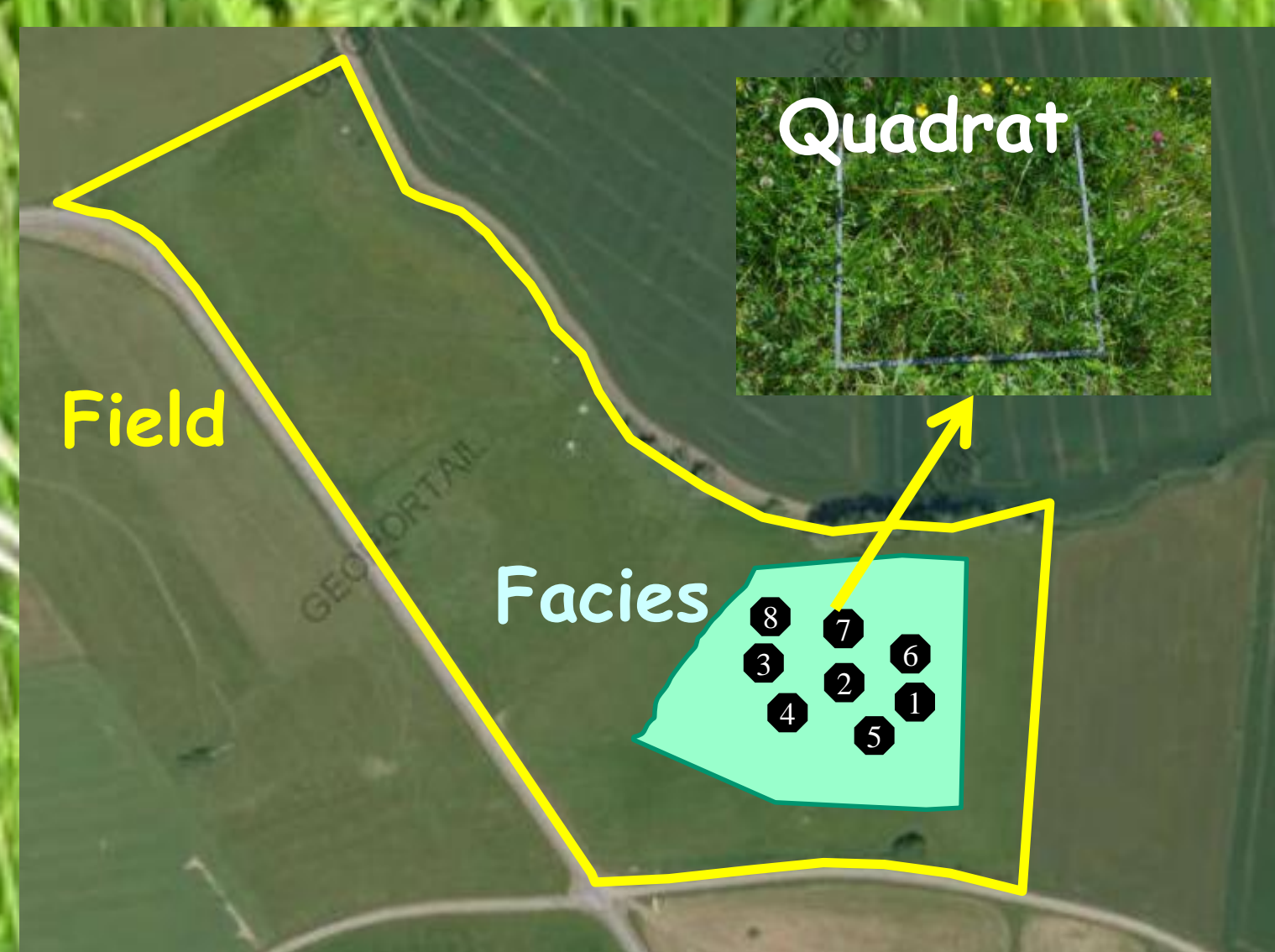
## Objective

Agronomists and ecologists classify permanent grasslands for various purposes: describe, understand or predict. In order to set their classifications, they use different characteristics to study the vegetation: botanical or functional composition, grass production and quality, etc. The main objective of the present work was to assess the links and the redundancy of vegetation characteristics, in a wide variety of pedoclimatic and management conditions.

## Methods and Results



178 permanent grasslands from atlantic to mountain conditions (2000m a.s.l.)  
44% only grazed, 12% only cut  
N fertilisation : 0 to 500 kgN.y<sup>-1</sup>.ha<sup>-1</sup>  
(Michaud et al., 2011)



Analysis of botanical composition (presence, dominance) in 8 quadrats (0.25m<sup>2</sup>) in spring 2009 within an homogeneous vegetation facies



Determination or calculation at community level of 8 vegetation characteristics (Table 1)

### Two categories of vegetation characteristics:

- ✓ Functional characteristics (LDMC, SLA, LLS, DI, NOS and PES) = mean value (8 quadrats) of plant life traits weighted by species dominance (visual estimation)
- ✓ Taxonomical characteristics (DOM, PRE) = grasslands were classified in vegetation types (multivariate analysis) for presence and for dominance (2 distinct classifications)

	LDMC	SLA	LLS	DI	NOS	PES	DOM
Leaf Dry matter Content (LDMC)	.						
Specific Leaf Area (SLA)	0.33***	.					
Leaf Life Span (LLS)	0.42***	0.05**	.				
Date of inflorescence (DI)	ns	0.16***	ns	.			
Number of oligotrophic species (NOS)	0.26***	0.06***	0.18***	ns	.		
Proportion of entomophily species (PES)	ns	ns	ns	0.09***	0.02*	.	
Dominance of species (DOM)	0.41***	0.14*	0.41***	0.40***	0.51***	0.32***	.
Presence of species (PRE)	0.29**	0.19***	0.27***	0.45***	0.58***	0.31***	Khi <sup>2</sup> =516

Table 1: Relations between vegetation taxonomic and functional characteristics of the French network of 178 permanent grasslands. Values indicate the coefficients of determination and are associated to statistical significances (ns, \*= $P < 0.05$ , \*\*= $P < 0.01$  or \*\*\*= $P < 0.001$ )

### Results:

Most of relations show a link between criteria (table 1), and the hypothesis of variable independence is therefore to be ruled out. Contrasted situations were nevertheless observed: among functional criteria, LDMC is linked to SLA and LLS, as previously demonstrated by Ansquer et al. (2009). The relation between others functional criteria are either not statistically significant (i.e. LDMC and DI) or with a poor quality model explaining less than 30% of the variance. The relations between taxonomic criteria (DOM and PRE) and functional criteria are always significant (except for DOM and SLA). DOM appears as a key criteria as it is linked with taxonomic and functional features. Despite of the value of the khi2 test, the similarity between classifications of grasslands based on presence and dominance was weak.

## Conclusions / Perspectives

The criteria used to classify grassland that we have tested are not redundant (except for LDMC vs SLA and LLS), but at the same time they are not fully independent. Taxonomical and functional characteristics are not redundant and each category of criteria provide specific information on sward features. Thus, to predict from vegetation characteristics the agronomical and ecological services (Harrison, 2010) provided by grasslands single criterion based classifications must be avoided.

Ansquer, P., et al. (2009). Convergence in plant traits between species within grassland communities simplifies their monitoring. *Ecological Indicators* 9, 1020-1029.  
Harrison, P.A. (2010). Towards an assessment of multiple ecosystem processes and services via functional traits. *Biodiversity and Conservation* 19, 2873-2893  
Michaud A. et al. (2011). Environmental factors influencing botanical and functional composition of permanent grasslands. *J. Agriculture Science*, in press

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