



- In the new specifications of most of PDO (protected designation of origin) cheeses, strong emphasis has been placed on grass and pasture in order to consolidate their specific features. These recent requirements need information on how best to balance the feeding systems used on the PDO dairy farms.
- Our purpose was to compare the zootechnical performances, grass productivity and pasture biodiversity of two grazing systems for dairy cows: (1) **ROTATIONAL GRAZING WITH A HIGH STOCKING RATE** on fertile **grassland** displaying moderate biodiversity (DIV-), and (2) **CONTINUOUS GRAZING WITH A LOW STOCKING RATE** on broadly **diversified permanent grassland (DIV+)**.

## SITE, SYSTEMS AND MEASUREMENTS

The two grazing systems were set up from May to September in 2008 and 2009 on the INRA farm at Marcenat, located in the upland region of central France (*altitude 1080 m, annual rainfall 1100 mm, mean annual temperature 7.7 C*):



**Continuous grazing (DIV+)** on diversified permanent grassland at a 'low' stocking rate (1.0 LU ha<sup>-1</sup>) with no fertiliser since 30 years.



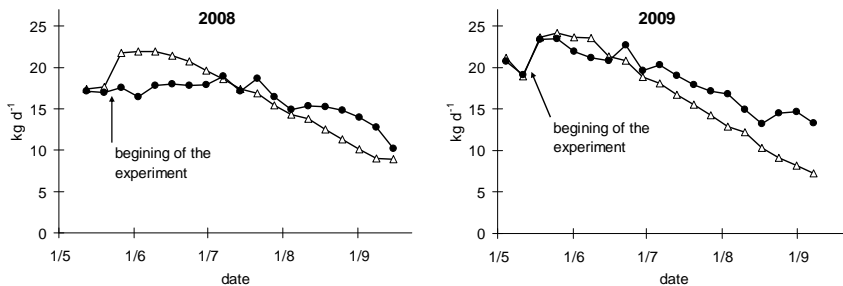
**Rotational grazing (DIV-)** on former temporary grassland at a 'high' stocking rate (1.8 LU ha<sup>-1</sup>) with a fertilization of 80 uN ha<sup>-1</sup> yr<sup>-1</sup>.

**Twelve cows per system with no concentrate supplementation were used**

**Measurements:** Individual dairy production, fat and protein content, cows live weight and body condition score, crude protein concentration of faeces, somatic cell count, accumulation of biomass, grass height, dry matter cellulase digestibility and CP of the grass offered, botanical surveys and insects capture.

## PRODUCTION

Milk production by week of cows from DIV+ (△) and DIV- (●) systems during 2008 and 2009



- At the beginning of the grazing season, **DIV+ showed higher milk production than DIV-**, due to a greater herbage allowance and better quality of grass selected by cows,
- Two months later an **inversion of the milk production curves** was observed, following the fall in grass nutritional value,
- **From July to September, DIV-** allowed a similar milk production to that of DIV+ in 2008 and a higher production in 2009 (+ 1.5 kg d<sup>-1</sup> per cow),
- The DIV+ cows had a **higher milk fat content** ( $P < 0.05$  in 2009), **lower protein content** ( $P < 0.05$  in 2008) and the same SCC.
- **Animals' weight** was not affected by the systems.

## BIODIVERSITY

The DIV+ grassland presented **double the number of plant species** per quadrat than DIV- (23.9 vs. 12.2,  $P < 0.001$ ) and the vegetation Shannon index was higher ( $P < 0.001$ ). The number of insects captured per line was not different between the grasslands, but the **insect Shannon index was higher in DIV+** ( $P < 0.01$ ).



This study provides evidence to support discussion in the cheese industry of the balance between production and biodiversity in upland dairy systems:

- ➔ **Continuous grazing** with a low stocking rate on diversified grassland gives good milk performance on putting out to pasture and is compatible with a high level of biodiversity.
- ➔ **Rotational grazing** on fertile grassland allows stable high milk production per ha and hay stocks. However, its more complex management requires forward planning and can cause grass shortages in summer. This type of grazing also needs more inputs, is less conducive to biodiversity, and causes discontinuities in production when the cows change plots that can be detrimental to farm cheesemaking.

In addition, further results on cheese quality will be soon available on this experiment.