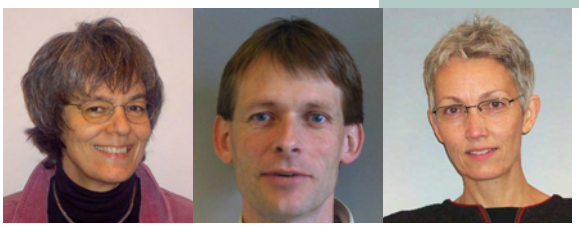
Herbs in the grassland



By Karen Søegaard, Jørgen Eriksen, and Margrethe Askegaard, Department of Agroecology and Environment, University of Aarhus, Tjele, Denmark

Ongoing experiments have shown that herbs can constitute a significant proportion of the sward and that management affects the composition. However, the competitive strength and feeding value of the different herb species varied highly.

Many organic dairy farmers include herbs in the grassland seed mixture. There are different reasons for establishing herbs in the sward including higher biodiversity in the field, improved herbage quality with a beneficial influence on the animal and better marketing products regarding taste or food quality.

But no matter the target it is essential that the proportion of herbs is substantial, if the expected benefits are to be achieved. However, very often the herbs only constitute a very small part of the sward.

Available knowledge about herbs is limited. In an ongoing ICROFS project we investigate the establishment and effects of management. The herbs are mixed with grass/clover seeds and broadcasted, and plots are examined on five organic dairy farms and in a field experiment at Research Centre Foulum.

Botanical composition

In all the experiments herb seed constitutes 19% of the seed rate, which are much higher than normally used.

	% of seed	Farm number				
		1	2	3	4	5
Grass	66	32	43	54	34	18
White clover	12	36	24	14	43	51
Red clover	3	13	13	0	5	4
Chicorie		9	8	10	5	9
Plantain		8	10	8	7	13
Caraway		0	1	13	3	2
Burnet		0	0	0	1	1
Birds foot trefoil		2	0	0	1	2
Sainfoin		0	0	0	0	0
Chervil		0	0	0	0	0
Total herbs	19	19	19	31	17	26
Weeds		0	1	0	1	1

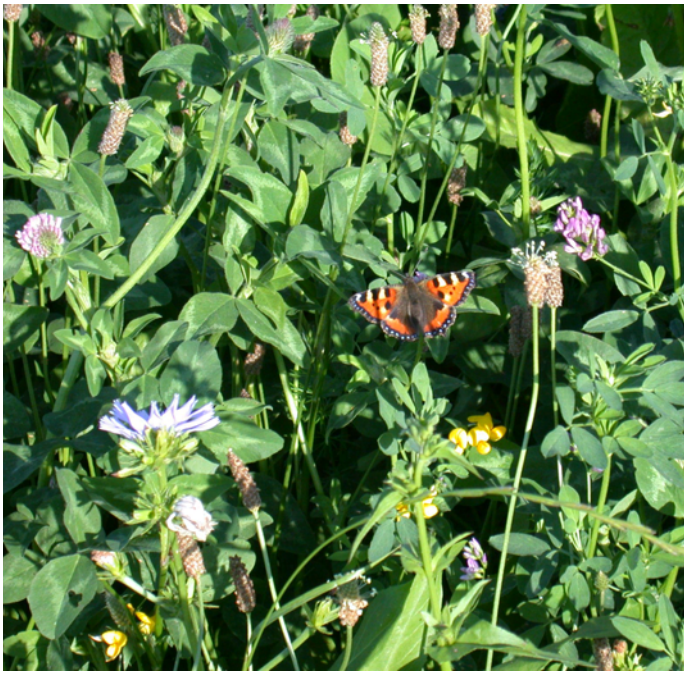
Table 1. Botanical composition of the sward (% of dry matter) in pastures grazed by dairy cows on five different organic dairy farms. Results from first year after establishment.

	IVOMD	NDF	Crude protein	Crude ash
Grass	75	53	13	8
White clover	76	29	23	10
Red clover	74	38	22	10
Chicory	72	37	14	14
Plantain	66	41	14	13
Caraway	83	27	16	15
Burnet	59	26	14	10
Birds foot trefoil	73	28	24	8

Table 2. Feeding value of the single species in the sward. In vitro organic matter digestibility (IVOMD, % of OM), neutral deterent fibre (NDF, % of DM), crude protein (% of DM) and crude ach (% of DM). Results from June 2007 of species in pastures on five farms.

In the plots on farms the herbs constituted 17-31 % of dry matter (DM), but the competitive strength of the single species varied considerably (Table 1). Plantain and chervil did not establish. They can establish very well in pure stand but did not in the grass/clover seed mix and there were only few plants. Burnet and birds foot trefoil establish fairly well with many plants, but they were small, and therefore the proportions of DM were low.

Caraway plants were tiny in the first year, but got larger in the second and third year. Chicory and plantain had the highest competitive strength (Table 1). The composition of the traditional grassland species also varied considerably, with 18 to 54 % grass, 14 to 51 % white clover and 0 to 13 % red clover of DM. Variability between farms may be due to soil conditions and managements.



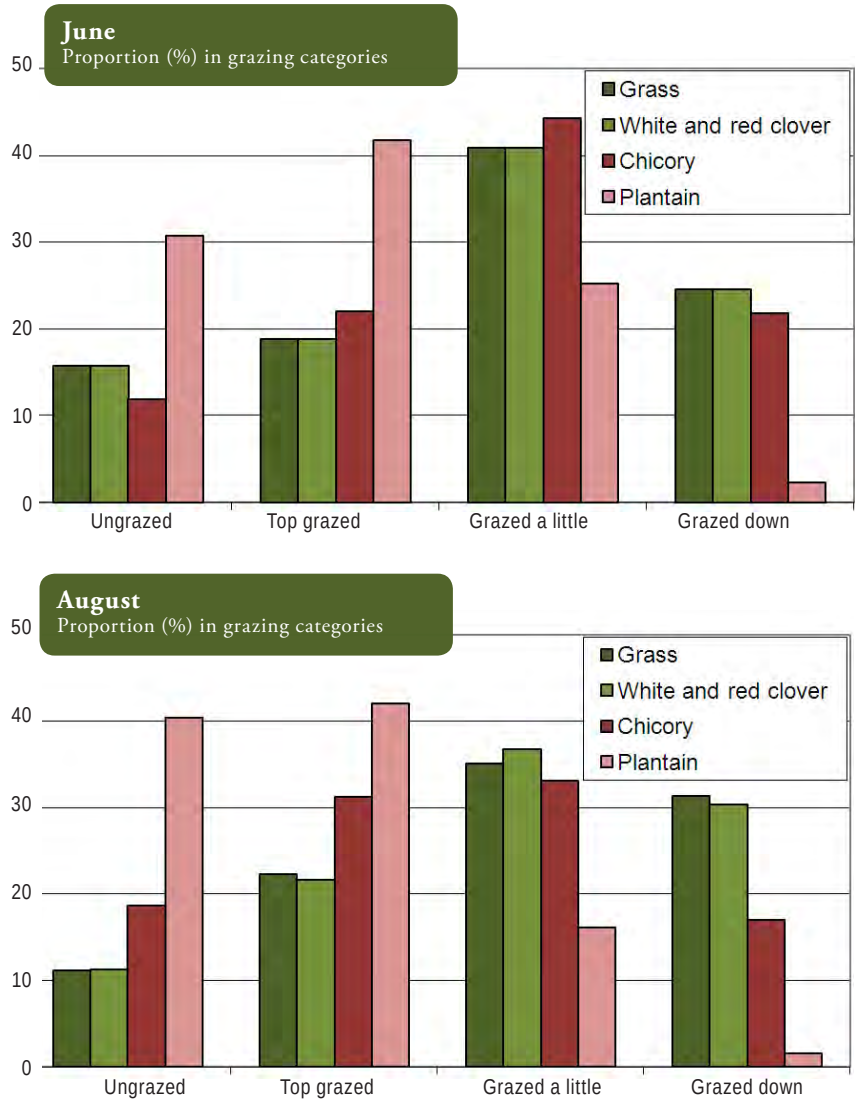


Figure 1. Proportion of the species grazed by dairy cows at different categories on five farms. Results from 2007.

Expectations to the herbs

- A brand to increase the sale
- Higher biodiversity in the field
- Higher appetite and intake
- Improved feeding quality
- Improved animal health
- Improved animal product

At Foulum we examine, how management affects the competition between plant species. With slurry application chicory competed better and the proportion of chicory in the sward increased. Opposite, with slurry the proportion of birds foot trefoil decreased. Plantain and caraway were affected by the cutting/grazing strategy, the proportion of both being higher under cutting than grazing.

Feeding value

The herbs, all dicotyledonous, had a lower NDF-concentration than grass, which primarily was perennial ryegrass (Table 2). Among the herbs plantain had the highest NDF-concentration and at the same time the degradability of NDF was very low. The digestibility of organic matter was also very low in plantain. The digestibility of burnet was surprisingly low considering the NDF-concentration. Caraway had the highest digestibility of organic matter and the digestibility did not decline during the growing season, which normally is the case for other grassland species. The degradability of NDF was also very high. The concentration of crude protein was grouped in two; the leguminous (22-24 %) and the non leguminous plants (13-16 % of DM).

The content of crude ash was high for some of the herbs. Chicory, plantain and caraway had a high concentration of many minerals - but not always the same minerals. For instance chicory had a high concentration of sodium, magnesium, copper and zinc, and caraway a high concentration of phosphor.

Thus, the herbage quality varied highly between species. But how this variation affects the feeding quality, palatability and intake of the whole sward in multi species grassland is uncertain.

Strong competitors:
Chicory , long leaved plantain, caraway

Weak competitors:
Salad burnet, birds foot trefoil, melilot

Difficult to establish in mixed swards:
Sainfoin, chervil

Palatability

Normally the sward height in pastures on farms is relatively high, giving the dairy cows a high offer. Selection between species is therefore possible. The cows mostly ate the herbs as the grass/clover. Plantain was the only exception.

The cows especially avoided the flowers of plantain but also the leaves to some extent (Figure 1). For the rest of the herbs rejection could take place, when part of the plants had been too old. This was the case for chicory in august shown in figure 1.

The future

The ongoing experiment provides new knowledge about growth and herbage quality of most of the herbs used for the time being. But there is still be a lack of knowledge concerning the effects on nature/landscape, the animals' appetite and health, and the meat and milk products.

Further reading
You can read more on the website of the DARCOF III research project, ECOVIT:

www.ecovit.elr.dk/uk