

## Characterisation of herbage from temperate organic pastures

E. Kuusela

University of Joensuu, Department of Biology, PO Box 111, FIN-80101 Joensuu, Finland, Email: eeva.kuusela@joensuu.fi

**Keywords:** organic dairy farming, pastures, herbage nutritive value

**Introduction** Grazing is an essential part of organic dairy farming systems. Although the nutritive value of herbage and herbage availability determine the intake and nutrient supply for grazing cows, the composition of typical herbage from organic pastures has been unclear.

**Materials and methods** Pre-grazing herbage mass and herbage nutritive value was assessed through entire grazing seasons (1996-1999) in six experiments at the Siikasalmi research farm (62°30'N, 29°30'E). Perennial sward mixtures contained white clover (*Trifolium repens*), alsike clover (*Trifolium hybridum*) red clover (*Trifolium pratense*) or birdsfoot trefoil (*Lotus corniculatus*) and complementary grasses were meadow fescue (*Festuca pratensis*), timothy (*Phleum pratense*) and smooth meadow-grass (*Poa pratensis*). Annual sward mixtures contained legumes (*Vicia villosa*, *Vicia sativa*, *Trifolium resupinatum* or *Trifolium repens*), barley (*Hordeum vulgare*) and Italian ryegrass (*Lolium multiflorum*). No fertilisers were applied, except composted manure in Experiment 5. The average length of a rotation cycle was 21 days. After each grazing period the areas were topped with a mower to a height of 10 cm.

**Results** Organic pastures resulted in a moderate pre-grazing herbage mass with a good nutritive value (Table 1).

**Table 1** Mean values of pre-grazing herbage mass and herbage nutritive value in six grazed experiments

Experiment	1. Clover-grass mixture 1996-1998	2. Clover/Bidsfoot mixture 1998	3. Clover-grass mixture 1996-1997	4. Clover-grass mixture 1998	5. Annual legume-cereal-grass m. 1999	6. Annual legume-cereal-grass m. 1999
Pre-grazing herbage mass (kg DM/ha)	1830	1664	1265	1945	1723	1827
Chemical content of DM						
- Ash (g/kg DM)	96.5	93.6	90.3	90.5	118	116
- Crude protein (g/kg DM)	184	165	177	170	206	217
- Neutral detergent fibre (g/kg DM)	510	447	521	453	433	391
<i>In vitro</i> digestibility of organic matter	0.754	0.758	0.753	0.748	0.751	0.760
Mineral content of DM						
- Calcium (g/kg DM)	7.1	8.4	Not measured			
- Magnesium (g/kg DM)	2.2	2.5	Not measured			
- Phosphorous (g/kg DM)	4.3	3.3	Not measured			
- Potassium (g/kg DM)	36.2	29.0	Not measured			

**Discussion** Herbage digestibility depends primarily on the state of maturity (length of grazing cycle) and also on plant species and growing conditions (Buxton, 1996). Crude protein content depends on soil N-availability and biological N-fixation (legumes). Despite different botanical compositions, mean digestibility was of a similar high level in all experiments, while crude protein values varied more. In contrast, Finnish N-fertilised grass pastures usually have a slightly higher digestibility and crude protein content. It has been suggested that extended rest periods between grazing episodes is one means of increasing the herbage mass of N-deficient pasture, even though this may be at the expense of herbage nutritive value (Delagarde *et al.*, 1997). Hence, in organic farming systems, the optimum length of rotation cycle is often a compromise between digestibility and the amount of regrowth, as measured by pre-grazing herbage mass. In this study, the mean Ca and Mg contents of legume-containing herbage were higher, but the P and K contents were similar to Finnish conventional pastures.

### References

- Buxton, D.R. (1996). Quality-related characteristics of forage as influenced by plant environment and agronomic factors. *Animal Feeding Science and Technology*, 59, 37-49.
- Delagarde, R., J.L. Peyraud & L. Delaby (1997). The effect of nitrogen fertilization level and protein supplementation on herbage intake, feeding behaviour and digestion in grazing dairy cows. *Animal Feed Science and Technology*, 66, 165-180.