

The Grazemore decision support system for grazing management of dairy cows

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Introduction Low prices of concentrates and the high demands for good management of grass growth associated with grazing, have led to lower utilisation of grazed grass in Europe. The use of decision support systems (DSS) with valid predictions of herbage growth (HG) and milk yield (MY) may improve grazing management for dairy farmers. The aim of this study was to explore the possibilities to improve grazing management of dairy cows in Europe, by developing a DSS within the European Union project, Grazemore.

Material and methods The Grazemore DSS was developed for rotational grazing systems with perennial ryegrass (*Lolium perenne* L.) and white clover (*Trifolium repens* L.) swards. The DSS is a large simulation platform displaying the effect of variance of management and environment on, MY (kg cow/day), herbage intake (HI) (kg DM/cow per d) and HG (kg DM/ha per d). The solution of the DSS can be described as a group of bank accounts. The "accounts" (paddocks) are replenished with grass with individual growth rates (interest rates) predicted by an HG model (Barrett *et al.*, 2004). The removal of grass from the paddocks acts as withdrawals, and is predicted by an HI model (Delagarde *et al.*, 2004). The DSS can also optimise a suggested grazing and cutting calendar for the farm depending on the management and feeding preferences of the user. Different grazing scenarios can be biologically and economically evaluated under different climatic conditions.

Simulations are available from 1 March to the end of October based on, N fertiliser input, daily measurements of average temperature (°C), precipitation (mm) and photosynthetic active radiation (MJ/m²). The DSS performs daily predictions of herbage mass (HM) (kg DM/ha), HG, organic matter digestibility (OMD, %), crude protein (g/kg) and white clover contribution (% DM) for each paddock. Milk yield and HI are predicted as herd averages for the residence period in each individual paddock, depending on the grazing management, supplementary feeding and the status of the herd. The DSS predictions of HM on a paddock level and MY on herd level have been externally evaluated by Centro de Investigaciones Agrarias Mabegondo, Spain, on 27 farms in five countries in Western Europe during the 2004 season. The evaluation is based on weekly measurements of HM in individual paddocks and herd average MY, during the residence in the paddocks.

Results The preliminary results from the on-farm validation of the DSS are presented in Table 1.

Table 1 Mean values for milk yield (kg/head per d) for herds and herbage mass (kg DM/ha) in paddocks, observed and predicted by the Grazemore DSS 1.0 on 27 farms in Europe during 2004; regression analysis between observed and predicted values and mean predicted error (MPE) and relative predicted error (RPE)

Parameter	n	Observed		Predicted		Difference		Regression analysis			Statistical analysis	
		mean	sd	mean	sd	mean	sd	a	b	R ²	MPE	RPE (%)
Milk yield	1732	25.2	3.61	25.1	4.37	0.17	3.26	11.1	0.56	0.46	3.27	12.9
Herbage mass	2392	2904	985	2985	1365	-82	1233	1853	0.35	0.24	1236	42.6

Conclusions Preliminary results from the on farm validation indicate that the Grazemore DSS may be used as a management tool to improve the use of grazed grass in Europe.

References

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