Determination of optimal grazing management for dairy cows in Galicia (Spain) using a decision support system

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Introduction GRAZEMORE is a decision support system (DSS) oriented to evaluate dairy grazing management decisions on pasture growth and milk production. The system integrates a herbage growth model (Barrett *et al*., 2003) and a herbage intake model (Delagarde *et al*., 2004) and has been validated in several EU countries. The objective of this work was to use this DSS to determine optimal grazing management of dairy cows at three supplementation levels and three grazing management strategies under Galician conditions.

Materials and methods The GRAZEMORE DSS was used to simulate eight grazing scenarios using the average weather data of the CIAM in Galicia (NW Spain). The scenarios considered a herd of 50 dairy cows with a continuous calving pattern, grazing 13.6 ha divided into 17 paddocks from 1 May to 30 October. The potential peak milk yield was estimated to be 36 kg/d. The scenarios compared where three concentrate supplementation levels (0, 4 and 8 kg DM concentrate/d) and three management options (a daily pasture area offered (DPAO) of 0.2, 0.3 and 0.5 ha/d). The scenario 8 kg DM/d vs. 0.5 ha/d was excluded due to DSS restrictions. The number of rotations during the grazing season was 7, 9 and 12 for a DPAO of 0.2, 0.3 and 0.5 ha/d respectively, but during the five initial rotations only half of paddocks where grazed with the remaining paddocks being assigned to silage production.

Results Average pasture allowance, pasture intake, total intake, and daily milk production between 15 May to 30 October are shown in Table 1. These results show that increasing DPAO resulted in higher pasture allowance (from 15.7 to 36.3 kg DM/d) and, as a consequence, pasture intake was raised from 9.9 to 13.2 kg DM/d. Increasing supplementation level reduced pasture intake and the magnitude of the reduction was enlarged with increased pasture allowances (0.4 kg DM in low DPAO vs. 0.6 kg DM in high DPAO for a total supplementation of 4 kg DM/d). Daily milk production ranged from 9.8 kg/d for 0.2 ha/d DPAO and no concentrate, to 27.0 kg/d for 0.3 ha/d DPAO and 8 kg DM concentrate. Total silage production in the low DPAO system (46 t DM) was almost twice the silage production in the high DPAO. Grass utilization (total pasture cut and consumed/pasture produced) increased with DPAO but decreased with concentrate supplementation level.

Table 1 Pasture and milk production for the scenarios simulated

Scenarios	Area offered (ha/d)							
	0.2			0.3			0.5	
Supplementation (kg Conc/cow)	0	4	8	0	4	8	0	4
Pasture allowance (kg DM/cow per d)	15.7	16.3	17.1	21.3	22.5	24.4	33.3	36.3
Pasture DM intake (kg DM/cow per d)	9.9	9.5	8.8	11.4	10.9	9.8	13.2	12.6
Total DM intake (kg DM/cow per d)	9.9	13.5	16.8	11.4	14.9	17.8	13.2	16.6
Milk (kg/cow per d)	9.8	18.6	25.2	13.1	21.5	27.0	17.2	24.8
Total pasture intake (t DM)	94.9	91,0	83.6	108.7	104.1	93.7	126.0	120.5
Total silage production (t DM)	46.4	46.4	46.5	33.2	33.2	33.3	23.9	23.9
Total grass produced (t DM)	165.9	166.1	166.3	161.4	161.7	162.0	160.4	160.8
Grass utilization (%)	85%	83%	78%	88%	85%	78%	93%	90%

Conclusions This work shows the sensitivity of the grazing system to different grazing and supplementation strategies and the ability of GRAZEMORE to assist in optimal management decisions. Future work must consider the impact of the grazing management system on the economics of the farm over the whole year.

References

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