Progress in Grazing Management of Dairy Cows by Using the Grazemore DSS

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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Progress in grazing management of dairy cows by using the Grazemore DSS

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Key words : software , advanced weather forecasts , herbage utilisation , milk production

Introduction Grazemore DSS is a decision support system (DSS) developed to improve the use of grazed grass in dairy production (Hetta et al ., 2005) . The software consists of a herbage growth model (HGM) (Barrett , Laidlaw & Mayne , 2004) and a herbage intake model (HIM) (Delagarde et al ., 2004) which predicts herbage intake and milk yield as daily averages for the herd during the residence time in individual paddocks . The HGM predicts herbage growth for individual paddocks (kg DM/day) based on information on average day temperature (℃) , precipitation (mm) and photosynthetic active radiation (PAR , MJ/m^2) . Meteorological institutes can provide farmers with advanced weather forecasts where these parameters are predicted in numbers on a daily base . The aim with this study was to investigate the possibilities to improve the grazing management supported by the Grazemore DSS in combination with advanced weather forecasts .

Materials and methods During 2006 a grazing experiment with 120 dairy cows was conducted from the 9 of June to the 31 of August at the Forage Research Centre , Umeå , Sweden (63°45′N ; 20°17′E ; 12 m elevation) . The cows grazed 22 ha of pasture which was divided into seven paddocks . The cows (Swedish Red) were divided into two sub herds ; high and low yielding cows depending on initial milk production . The grazing calendar (rotation order between paddocks) was determined by the Grazemore DSS utilising a seven day weather forecast of the parameters needed to run the HGM . The limitations for the DSS was set by user defined rules were the two groups of cows were kept in a restricted "first-last" grazing management system , where the high yielding cows entered a new paddock each day at night from 18 :00 to 06 :00 and there after the low yielding cows grazed the same paddock from 09 :00 until 15 :00 . The DSS was used to keep a high utilisation of the grass meanwhile maintaining a target milk production of 25 .5 kg of milk/cow per day through out the grazing season . When the cows were of pasture they were kept in a louse house stall and fed on average for the two subgroups 8 kg DM of concentrates and 3 kg DM of grass silage per day . Milk production was recorded individually twice daily . Herbage mass was recorded as the mean of DM yield from three cut plots (0 .9 m^2) in each paddock .

Results and discussion The results of the measurements and predictions of HM and MY and are presented in Table 1 . The MY represents the daily average milk yield for the two groups and the HM represents the individual HM above ground level in a single paddock . Comparisons of the actual and predicted MY show that the grazing management suggested by the DSS resulted in a small deviation from the targeted milk production (MPE = 9%) . There was a larger deviation (MPE = 30%) for the predicted HM in individual paddocks . However the over all bias in between targeted and recorded HM was small and the swards were in good condition trough out the experiment .

Table 1 *Mean values of actual (A) and by the Grazemore DSS predicted (P) milk yield (MY) (kg milk/cow/day) and herbage mass (HM) (kg DM/ha) .*

Target	n	A	Min(A)	Max(A)	STDV(A)	P	Min(P)	Max(P)	STDV(P)	Bias(A-P)	MSPE	MPE
MY	79	23 .5	21 .6	25 .5	0 .96	25 .5	24 .3	26 .5	0 .51	2 .0	4 .97	0 .09
HM	39	2393	1675	3359	487	2460	1754	3504	491	66 .0	518228	0 .30

n = Number of observations , MSPE = Mean square prediction error , MPE = Mean prediction error

Conclusions The high utilization of the grass in the paddocks with nice swards and a MY that was close to target indicate that the use of a DSS for grazing management in combination with advanced weather forecasts , may be an interesting alternative to increase the use of grazed grass in dairy production .

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