

**THE EFFECT OF FEED SUPPLEMENTATION AND SWARD
CHARACTERISTICS ON THE INGESTIVE BEHAVIOUR OF GRAZING EWES**

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Abstract

The objective of this study was to assess the effect of protein/energy supplementation and sward physical characteristics on grazing behaviour of lactating ewes grazing Italian ryegrass (*Lolium multiflorum* Lam.). The experiment was carried out in the spring of 1999 at the Universidade Federal de Santa Maria. The grazing behaviour was assessed in two periods: 2 and 3 September, and 8 and 9 October of 1999, using a group of twelve yearling ewes. Groups of four ewes were either supplemented (with 1% of the animals live weight) with soybean meal (protein source), with corn (energy source) or not supplemented. The experiment was carried out in a completely randomised block design with four replications. This experiment shows that grazing behaviour is more strongly affected by sward characteristics than by protein or energy supplementation.

Keywords: corn, soybean meal, Italian ryegrass, *Lolium multiflorum*, grazing behaviour

Introduction

Milking is a period of high demand of nutrient for ewes and a critical period for well development of lambs. Supplementing in this period has always been thought to have an important influence on ewe and lamb performance (Carvalho et al. 1999). However there is limited information on the relationship between grazing behaviour and sward or supplement characteristics during rapid changes in sward state (Penning et al., 1991). The objective of this study was to determine the effect of the protein and energy supplementation and sward physical characteristics on grazing behaviour.

Material and Methods

The experiment was carried out in the spring of 1999 at the Universidade Federal de Santa Maria (29° 43' S 53° 42' W), Brazil, on an Italian ryegrass sward. The grazing behaviour was assessed in two consecutive days of two different periods: 2 and 3 September, and 8 and 9 October.

Three groups of four lactating yearling ewes with suckling female lambs were used. One group was not supplemented and the other two groups were supplemented with either soybean meal (source of protein) or corn (source of energy). The animals were supplemented with 1% of their live weight in dry matter. Because of the slow herbage growth and the greater size of the oldest lambs in the second period, half of the lambs were weaned (two lambs of each treatment) and the respective ewes were taken out of the experiment.

The animals grazed an area of 0.62 m². They were submitted to an rotational grazing where the rotational length was determined by the residual herbage mass of 700 kg dry matter (DM)/ha. In the first period, the total area was sub-divided in areas of 1000 m², and in the

second period in areas of 1550 m². The animals grazed each area for two days in the first period, and for four days in the second period.

The grazing behaviour was recorded for two consecutive days in each period from dawn to dusk (from 6.00 to 20.00 hrs) at intervals of 10 minutes using the method of Jamieson and Hodgson (1979). Between each 10 minutes recording, rates of biting were measured using the 20 bite method of Forbes and Hodgson (1985).

Herbage mass was estimated by cutting three 0.25 m² quadrats to ground level with shearing scissors in each subdivided area before and after grazing. After cutting, the samples were dissected into categories for morphology (leaf lamina, sheath, stem, and dead tissue). The samples were then dried in a draught oven at 75°C and weighed individually. The variation of herbage mass (between before and after grazing) was also estimated. The sward surface height (SSH) was randomly measured using a sward stick (Barthram, 1986).

Analyses of variance were carried out to compare the treatment effects on grazing behaviour and herbage mass data. Analyses were made within periods, and also between periods (only using the data of the animals presented in both periods). Correlation analysis was used to clarify the relationship among proportions of time spent grazing, ruminating and idling. The data were analysed using statistical package SAS (SAS, 1990).

Results

The sward characteristics in both periods are presented in Table 1. There was no significant effect of the supplementation on grazing behaviour within each period. However there was a significant effect of periods. The animals spent proportionally more time grazing and less time ruminating in period 2 than in period 1 (Figure 1). These differences were also observed in

relation to rate of biting (Figure 1). There was no significant effect of the supplement on biting rate within each period, but there was a significant greater rate of biting in the second than in the first period. The animals did not show difference in rate of biting between morning and afternoon observation. There was a significant difference between period 1 and 2 in relation to the variation of herbage mass (difference between before and after grazing). Period 1 had greater difference than Period 2 (2.49 vs 1.84 kg DM/ha \pm 0.0318, P-value=0.0007). There was a significant and negative correlation between grazing and ruminating time (r (Pearson correlation coefficient) = -0.6132, P=0.0340), and grazing and idling time (r =-0.8448, P=0.0005), but there was no significant correlation between ruminating and idling time (r =-0.0976, P=0.7627).

Discussion

The animal behaviour was significantly affected by the variation of sward characteristics (Table 1) between Period 1 and 2. The smaller herbage mass difference (between before and after grazing) in Period 2 than in Period 1 indicates that the intake was smaller in Period 2 than in Period 1. The animals were probably affected by the low SSH, herbage mass and leaf/stem ratio. The effort required to select leaves in mature sward and to detach plant material near the ground in short swards may have restricted bite depth, the major influence on variation in bite mass and intake (Laca et al., 1992). The animals apparently tried to compensate the smaller bite mass in Period 2 increasing the rate of biting (Figure 1). However, in contrast with what was observed by Parsons et al. (1994), the rate of biting in the morning did show to be different from the rate of biting in the afternoon.

The result shown in Figure 1 is similar to the result reported by Penning et al. (1991). It suggests that grazing and ruminating time were interchangeable: as the time spent grazing

increased, the time spent ruminating decreased. Different from grazing and ruminating, idling does not seem to be affected by sward characteristics.

Supplementing did not have an important influence on grazing behaviour. This result confirms observations made by Hatfield et al.(1990). The small effect of supplements indicates that the modification promoted in the rumen environment by supplementing is not important to alter grazing behaviour, even in swards that limit intake by the low SSH, herbage mass and leaf/stem ratio. In this case, the animals seem to modify their behaviour in response to sward physical characteristics than due to the energy or protein requirement.

In conclusion the results clearly demonstrate that in swards of Italian ryegrass, grazing behaviour is more strongly affected by sward physical characteristics than by protein or energy supplementation. The decrease of SSH, leaf/stem ratio and herbage mass promote an increase in the proportion of time spent grazing, an decrease in the proportion of time spent ruminating and an increase in the rate of biting. The time spent idling is not affected by modifications of sward characteristics.

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Table 1 - Characteristics of a Italian ryegrass sward, average of leaf/stem ratio (L/S ratio), herbage mass (HM) and sward surface height (SSH) in Period 1 and Period 2.

	L/S ratio	HM (kg/ha)	SSH (cm)
Period 1	0.77	1509	7.5
Period 2	0.46	912	5.7

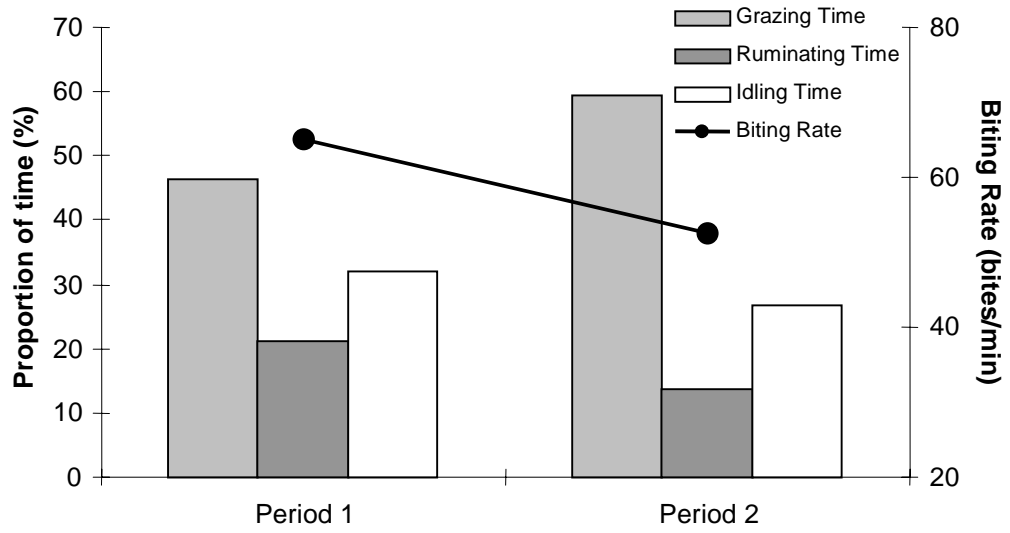


Figure 1 - Proportion of time spent grazing, ruminating and idling, and biting rate in the first and second periods (Period 1 and Period 2) of grazing behaviour assessment.