

Principal Components Analysis of Sward Structure and Ingestive Behaviour of Beef Cattle managed at Levels of Herbage Allowances in Natural Pasture

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Introduction

The management of herbage allowance (HA) is the main factor to adjust the requirements for the livestock production. However, the level of HA shapes the structure sward (Maraschin, 2001) and may determine different patterns of ingestive behavior. The multivariate analysis methods allows a comprehensive study of a set of variables, indicating possible relationships and differences. This study aimed to evaluate and to analyze by principal components of sward structure and ingestive behaviour of beef cattle grazing natural pasture in Southern Brazil.

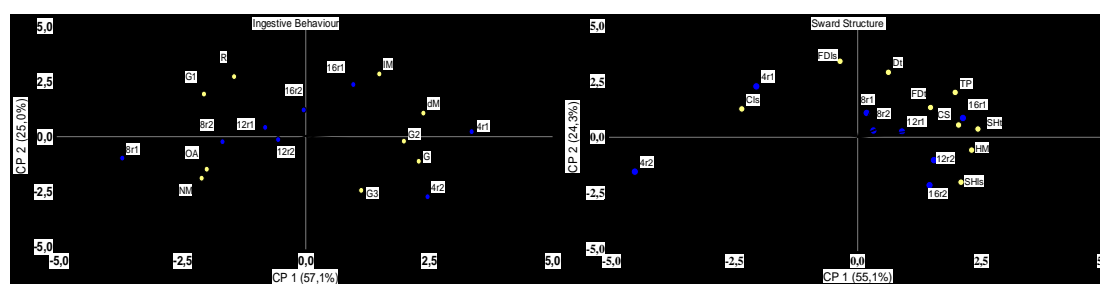
Materials and Methods

The study was conducted on 60 ha of natural pasture in Eldorado do Sul, RS, Brazil. The treatments were levels of HA (kg DM 100 kg LW⁻¹ day⁻¹ = %LW): 4, 8, 12 and 16%LW. A randomized block design with two replicates in the space was used within a continuous stocking management. The evaluations of sward structure and ingestive behaviour of the crossbred beef heifers cattle of 15 months age were conducted in January and February 2009. The parameters evaluated into the sward structure were: herbage mass (kg DM ha⁻¹, HM), sward height of low stratum and tussocks (cm, SHls and SHt), soil covered (% , CS), low stratum covered (% , Cls), frequency of defoliation of low stratum and tussocks (% , FDls and FDt) and tussock perimeter and distance between tussocks (m, TP and Dt). Ingestive behaviour was monitored by scan sampling every 5 min from dusk to dawn during one day in each month. It were observed grazing (G), ruminating (R), other activities (OA) and level of aggregation of animals with reported values between 1 (gregarious herd) and 3 (scattered herd). From these records we calculated the duration (min, dM), number (NM) and interval (min, IM) of meals. All variables were classified by experimental unit and submitted to principal component analysis (PCA) in the software InfoStat.

Results and Discussion

Figure 1 shows the ordination by PCA, which are plotted all the experimental units and variables with $r \geq 0.5$ for any of the axes. The two principal components represented 79.4 and 82.1% of total variation of the set variables of the sward and ingestive behaviour, respectively. PCA indicated an association between low HA and high lower strata proportion (variable Cls) as well as a lower tussocks presence. The lowest HA was also associated with low HM, low SHls and low CS, determining higher G time and dM and less gregarious behaviour, characterizing an exploratory behaviour associated with feed constrains.

Figure1: Ordination by PCA of variables of sward structure and ingestive behaviour of beef cattle managed at levels of HA in natural pasture. Experimental units (paddocks) represent by treatment:replicate.



Conclusions

The levels of HA in natural pasture determines distinct swards structures and ingestive behaviour of beef cattle. The low HA determines a low sward structure that is possibly unfavourable to forage intake.

Reference

Maraschin, G. E. 2001. Production potential of South America grasslands. In: International Grassland Congress, 19., Proceedings... Piracicaba, Brazil. 05-18.