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LEAF BLADE SELECTION BY SHEEP IN KLEINGRASS (*Panicum coloratum* L.) PASTURES WITH DIFFERENT DEFERMENT PERIODS

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Abstract

The winter use of standing dead biomass produced by warm season grasses during the previous growing season may be an alternative to grazing systems in the semi-arid Pampean Region of Argentina. This study evaluated: 1) the effect of different deferment periods on the leaf blade percentage and quality of 'kleingrass' (*Panicum coloratum* L.), a warm season specie recently introduced to that region, and 2) whether rams grazing the vegetation accumulated during these different periods are able to select leaf blades to maintain the quality of their diets. It was generated three treatments by deferment of the forage produced after harvesting in mid December 1987 (T1), and in early January (T2) and early February (T3), 1998. Length of the deferment reduced ($P<0.05$) the percentages of leaf blade from 42.2$\pm$0.01 % to 30.5$\pm$2.40%. However, the percentage of blades in ram diets remained stable (62$\pm$5.4%; $P>0.05$). The percentage of crude protein (CP) in the vegetation was not affected by the length of the deferment period ($P>0.05$), however CP contents in the blades were twice higher than in the rest of the

vegetation (4.13±0.9 *vs* 1.82±0.34). Rams actively selected leaf blades in all the treatments (P>0.05), but selection effort was stronger in those with longer deferment. These results indicated that rams are able to made an effort to select the plant part of highest quality, and suggest that this effort is restricted by the vegetation structure.

Keywords: Leaf blade selection, plant part quality, rams, forage deferment

Introduction

Even though sheep being able to select leaf blades to maintain their intake level, and the quality of their diets (Hodgson 1981, L´Huillier *et al*. 1984), in gramineous swards, increments in the percentage of the plant parts with lower quality can affect intake (Chacon and Stobbs 1976).

In Argentina, the semi-arid Pampean Region is charact2erized by dry winters, and the growth rate of temperate grasses during this season is near zero. One way to provide an economical winter forage is to use biomass produced during the previous growing seasons by warm grasses as stockpiling standing forage. "Kleingrass" (*Panicum coloratum* L.) is a warm season species with high quality and dry matter yield. Its leaf blades are more nutritive than sheaths and culms. However, it has lower blade percentages than other warm season species recently introduced to the region (Stritzler *et al.* 1996). Increases in the length of the deferment periods determine higher yields, but the forage produced has lower blade percentages (C. Ferri, personal observation). Thus, the objective of this study was to evaluate: 1) the effect of different deferment periods on the leaf blade percentage and quality in kleingrass, and 2) whether sheep are able to select leaf blades to maintain the quality of their diets.

Material and Methods

The trial was carried out in the Facultad de Agronomía (UNLPam) at Santa Rosa (36°46´S, 64°16´W), Argentina, using a pasture of "kleingrass" (*Panicum coloratum* L.) and 60 Pampinta rams with an initial live weight of 45,4±5,2 kg in July of 1998. It was generated three treatments by deferment of the forage produced after harvesting in mid December 1997 (T1), and in early January (T2) and early February (T3), 1998. The treatments were assigned at random with two replications.

After early frosts stopped pasture growth, it was harvested plant biomass in each treatment by clipping three 2 m^2 frames in each paddock to ground level. These samples were separated into blades, and sheaths+culms+inflorescences, and dried (24h 60°C) and weighed. It was computed total biomass availability by unit surface in each paddock, and the percentage of leaf blade. Finally the samples were ground in a Willey mill with a 1 mm sieve screen. These samples were used to determinate dry matter digestibility according to the method of Tilley and Terry (1963) and to determinate crude protein content by the semimicro Kjeldahl method (N x 6.25).

Grazing was conducted with daily strip changes, five rams per paddocks, and an allowance of 40 g DM kg LW^{-1} for all the treatments. The 8-day experimental period was preceded of a phase of adaptation of 15 days. We gathered feces of three rams by paddock daily by using a collector bags, and integrated them through animals in a composite. These composites were processed for microhistological analysis according to Sparks and Malechek (1968), and it was estimated the percentage of leaf blades in diets according the procedure proposed by Sierra *et al*. (2001). Rams selection by blades was evaluated by the following selectivity index: $SI_{(blades)}$= ($\%blades_{(Diets)}$ - $\%blades_{(Pasture)}$) / ($\%blades_{(Diets)}$ + $\%blades_{(Pasture)}$) (Stuth 1991).

Variation in total biomass, percentages of leaf blade in vegetation and diets, and in the selection indices was analysed by ANOVA with a completely ramdonized design, and treatments as factors. Variation in crude protein percentage was also analised by ANOVA, but with a split plot design, with treatment as plot and plant parts (blades *vs* sheaths+culms+inflorescences) as subplot. Differences among treatment were established by the Duncan test. By t-test we determined for each treatment whether $SI_{(blades)}$ was higher than zero, that is whether rams actively selected leaf blades.

Results and Discussion

Estimated forage availability was T1= 256±14.0, T2=221±24.6, and T3=192±6.1 $gMS.m^{-2}$. Length of the deferment reduced ($P<0.05$) the percentages of leaf blade from 42.2±0.01 % in T3 to 30.5±2.40 % in T1. However, the percentage of blades in the ram diets from different treatments did not differ in the percentage of blades ($P>0.05$), which remains stable at 62±5.4% (Figure 1). The percentage of crude protein in the vegetation was not affected by the length of the deferment period ($P>0.05$), but CP in blades was more than twice higher than in the rest of the vegetation (4.13±0.9 *vs* 1.82±0.34) (Figure 2). Rams actively selected leaf blades in all treatments ($P>0.05$), and the selection effort was stronger in those with longer deferments ($SI_{(blades)}$: $T_1=0.30±0.00^{a}$; $T_2=0.31±0.04^{a}$; $T_3=0.22±0.00^{b}$; $P<0.08$) (Figure 1).

In all the treatments rams selected leaf blades, the plant part with higher crude protein percentage, maintaining their percentage constant, in spite of the different biomass availability by unit surface. In the treatments with longer deferment periods, the selection efforts was stronger, although the differences in quality between blades and the rest of the vegetation were lower. This suggests that even though animals select blades to maintain the quality of their diets, their selection effort is restricted by the vegetation structure. As stated by O´Reagan (1993) for

different plant species, sheep appears to balance the unfavorable and favorable characteristics or a particular condition, and then select among plant parts accordingly.

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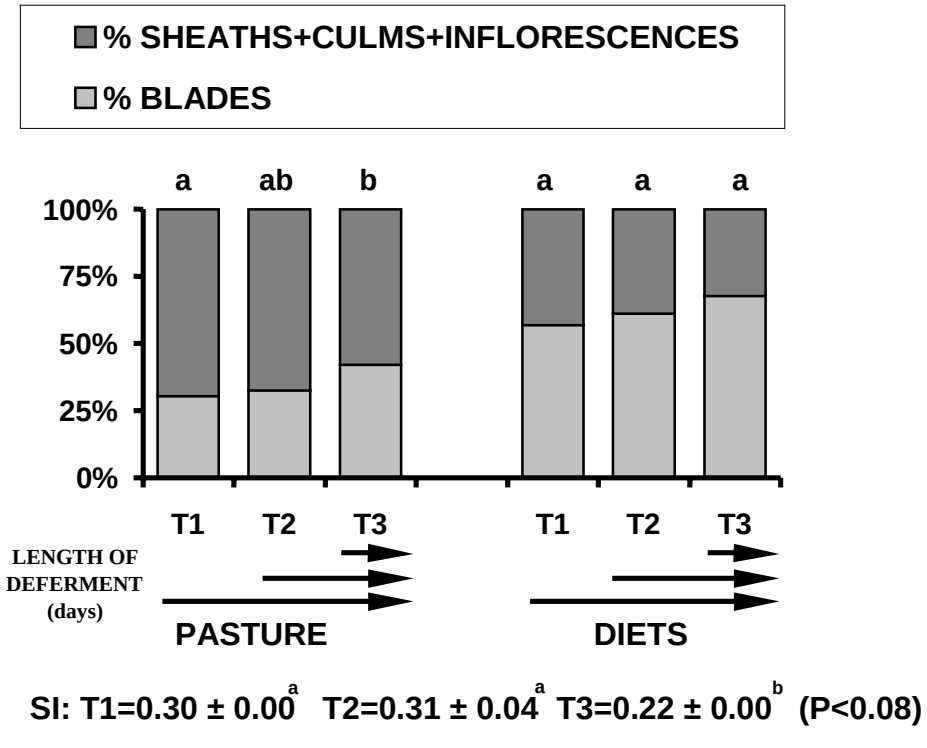

SI: T1=0.30 ± 0.00[a] T2=0.31 ± 0.04[a] T3=0.22 ± 0.00[b] (P<0.08)

Figure 1 - Average blade percentage of kleingr deferment periods: T1 (December), T2 (January) and T3 (February) and in the diets of grazing rams. SI = selectivity index. Different letters indicate differences among means in the pasture (P<0.05) and SI (P<0.08).

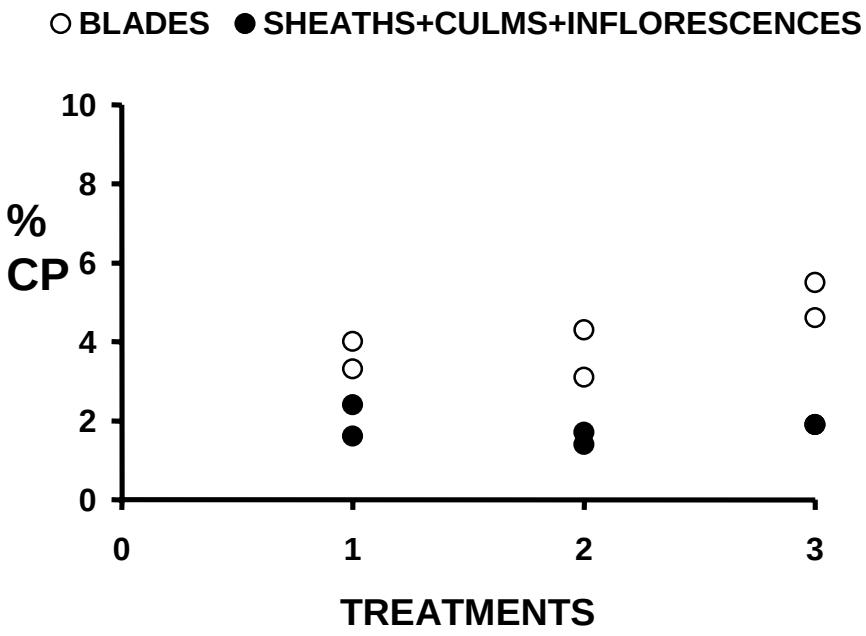

Figure 2 - Percentage of crude protein (% CP) in blades and the rest of the vegetation of "kleingrass" under different deferment periods: T1 (December), T2 (January) and T3 (February), and in the diets of grazing rams.