

**SEASONAL BOTANICAL COMPOSITION AND AVAILABLE FORAGE OF
NATURAL GRASSLANDS IN THE SOUTHEASTERN RANGE REGION OF RIO
GRANDE DO SUL, BRAZIL.**

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Abstract

The objective of the study was to verify the influence of climatic seasons on botanical composition and on available dry matter of grasslands in the physiographic region known as Serra do Sudeste (Southeastern Range), RS, Brazil. The climate is Cfb according to Köppen's classification. The experiment was conducted in two natural grasslands submitted to two pre-experimental stocking rates [area 1: 0.65 AU ha⁻¹ (normal grazing); area 2: over 2.0 AU ha⁻¹ (overgrazing); AU: Animal Unit = 500kg live weight]. Stocking rates throughout the experimental period (June 1996–July 1997) were 0.4 and 0.65 AU ha⁻¹, over winter and the other seasons, respectively. The evaluations were made at the end of each season, using the Botanal package. There was a short forage supply over late autumn/early winter. The two species groupings warm-season grasses (70–78% of total dry matter) and broad leaves (18–24%) were the main components of the vegetation in the lower layer of the two grasslands. Warm-season grasses had their participation slightly increased during the warmer seasons.

The pre-experimental overgrazing of area 2 favoured the contribution of the minor groups cool-season grasses, warm-season legumes and cool-season legumes.

Keywords: Botanal, broad leaves, dry matter, forage grasses, forage legumes, stocking rate

Introduction

The extensive animal production in the physiographic region Serra do Sudeste (Southeastern Range), RS, Brazil is chiefly based on continuous stocking of natural grasslands. These grasslands have been grazed by cattle, sheep and horses since they were introduced in late 17th century. In the dominantly transitional type climate of Rio Grande do Sul, warm season grassland species predominate over cool season species (Girardi-Deiro *et al.*, 1992; Mohrdieck, 1993). The change of seasons in Serra do Sudeste influences forage production, its nutritional quality and botanical composition, thus affecting animal productivity (Alfaya *et al.*, 1997). According to a plant community survey on a grazed fertilized natural grassland in the region Depressão Central (Central Depression) of RS, six botanical families contributed with 73,7% of all species present; *Gramineae* gave the greatest contribution, followed by *Compositae*, and then *Leguminosae*, *Rubiaceae*, *Umbelliferae* and *Cyperaceae* (Moojen, 1991). In Serra do Sudeste, botanical data informs only the most common grasslands species (Mohrdieck, 1993). There are no studies in Serra do Sudeste on botanical composition and available forage changes over the seasons of the year. The objective of this study was to verify the influence of the climatic seasons on herbage botanical composition and on dry matter availability in controled grazed grasslands. This is valuable knowledge towards improved management of these grasslands and of feed supply, aimed at minimizing losses in animal live weight during the winter.

Material and Methods

The study was conducted in two farms at the physiographic region known as Serra do Sudeste, Rio Grande do Sul, Brazil. The climate is Cfb, according to Koëppen's classification.. In the nearest Meteorological Station (distant approximately 20 km), situated at 31°26'S and 53°06'W, the mean annual rainfall is 1426 mm and 16.2° C the mean temperature; frosts average 18 events per year. One paddock was selected in each farm (area 1: 12 ha; area 2: 9.5 ha) on average altitude 400–450 m ASL. The soils are Mollic Hapludalf (area 1) and Typic Kanhapludult (area 2). In the pre-experimental period area 1 was stocked with 0.65 AU ha⁻¹ (normal grazing pressure for the region) and area 2 was overgrazed with more than 2.0 AU ha⁻¹ (AU:Animal Unit=500 kg live weight). Stocking rates during the experimental period (June 1996 to July 1997) were 0.4 AU ha⁻¹ over winter and about 0.65 AU ha⁻¹ through spring, summer and autumn. In June 1996(beggining of the study) the available dry matter was taken from quadrat (0.25 m²) cuttings. Botanical composition and available dry matter during the experiment were evaluated using the Botanal package (Tothill *et al.*,1978). Readings were done on two fixed transect lines per paddock, at the end of each season, at approximate intervals of 90 days. The species were grouped as follows: 1. Warm-season grasses; 2. Cool-season grasses; 3. Warm-season legumes; 4. Cool-season legumes; 5. Broad leaves. Broad leaves only included species of the lower layer of the plant community; the common non-forage bushy species of the upper layer (*Eryngium horridum*, *Baccharis trimera*, *Eupatorium buniifolium*, *Senecio* spp.) were not taken into account. These arbustive species corresponded to 35 to 50% of the covered soil area, depending on the season of the year.

Results and Discussion

Available dry matter. In June 1996 (beginning of the study) the available dry matter in the previously overgrazed area 2 was 360 kg ha⁻¹; in the normally grazed area 1 it was also low, 768 kg ha⁻¹. These figures show the short forage supply over late autumn/early winter in both areas. In late winter there was still less total available forage in area 2 (Figure 1) despite the similar grazing pressure imposed over the period. This reflects the effect of previous heavy grazing, which persisted throughout spring and summer, whereas in autumn of 1997 the amount of available forage was similar in both areas 1 and 2, respectively 2750 and 2632 kg ha⁻¹ (Figure 1). There was a noticeable growth recovery of the previously heavy grazed area 2. At the average stocking rate of 0.65 UA ha⁻¹ over spring, summer and early autumn there was sufficient forage available for the grazing animals, confirmed by animal live weight gains, approximately 500 g day⁻¹ (Alfaya *et al.*, 1997).

Botanical composition. The dominant group was warm-season grasses (Table 1); the main species were *Paspalum notatum*, *Paspalum* spp. and *Axonopus affinis* (abundant in lower sites). The predominance of these grasses was also reported in grasslands at other regions of Rio Grande do Sul (Girardi-Deiro *et al.*, 1992; Moojen, 1991). Within the cool-season grasses group the principal species were *Pitochaetium montevidense*, *Stipa* spp. and *Vulpia* spp.; except for winter, their presence ranked from very low in the other seasons (0.7 to 4.7 %) to absent in summer (Table 1). In the warm-season legumes group the most frequent species was *Desmodium incanum*, known by its widespread presence in Rio Grande do Sul. There was some occurrence of *Stylosanthes* spp. These legumes had low contribution in botanical composition in all seasons, mainly over autumn and winter. The group of cool-season legumes was barely available and present only during the cooler period; the main

species were the annuals *Trifolium polymorphum* and, in smaller scale, *Trifolium campestre*. The pre-experimental overgrazing in area 2 tended to increase the contribution of the minor groups cool-season grasses, warm-season legumes and cool-season legumes. Among broad leaves the most frequent species in the lower layer were *Dicondra* spp., *Richardia brasiliensis*, *Herbertia julchella*, *Ortopoppus angustifolius*, *Juncus bufonius*, *Soliva pterosperma*, *Sida rhombifolia*, *Oxalis* spp. and *Cyperus* spp. In general, the contributions of warm-season grasses and broad leaves to the available forage in the lower layer remained within 70–78 and 18–24%, respectively, and reached approximately 90–95% of the forage (Table 1). The warm-season grasses slightly increased their participation during the warmer periods. The results are in agreement with data obtained in other regions of the State, such as in Depressão Central (Moojen, 1991). It is concluded that warm-season grasses and broad leaves are the main components of the grassland vegetation in the lower layer and that there is a short forage supply to the grazing animals over late autumn and winter.

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Table 1-Seasonal botanical composition, by groups of species, of two natural grassland areas.

Groups	Botanical composition (% of total dry matter)							
	Winter		Spring		Summer		Autumn	
	area 1	area 2	area 1	area 2	area 1	area 2	area 1	area 2
Warm-season grasses	70.0	66.9	70.6	73.3	76.8	74.0	72.0	78.6
Cool-season grasses	7.9	5.8	4.7	1.6	-	-	2.0	0.7
Warm-season legumes	0.2	0.3	2.1	6.8	2.7	8.0	0.2	0.8
Cool-season legumes	0.4	2.9	-	-	-	-	-	0.3
Broad leaves	21.4	24.0	22.5	18.3	20.5	18.0	26.0	19.5

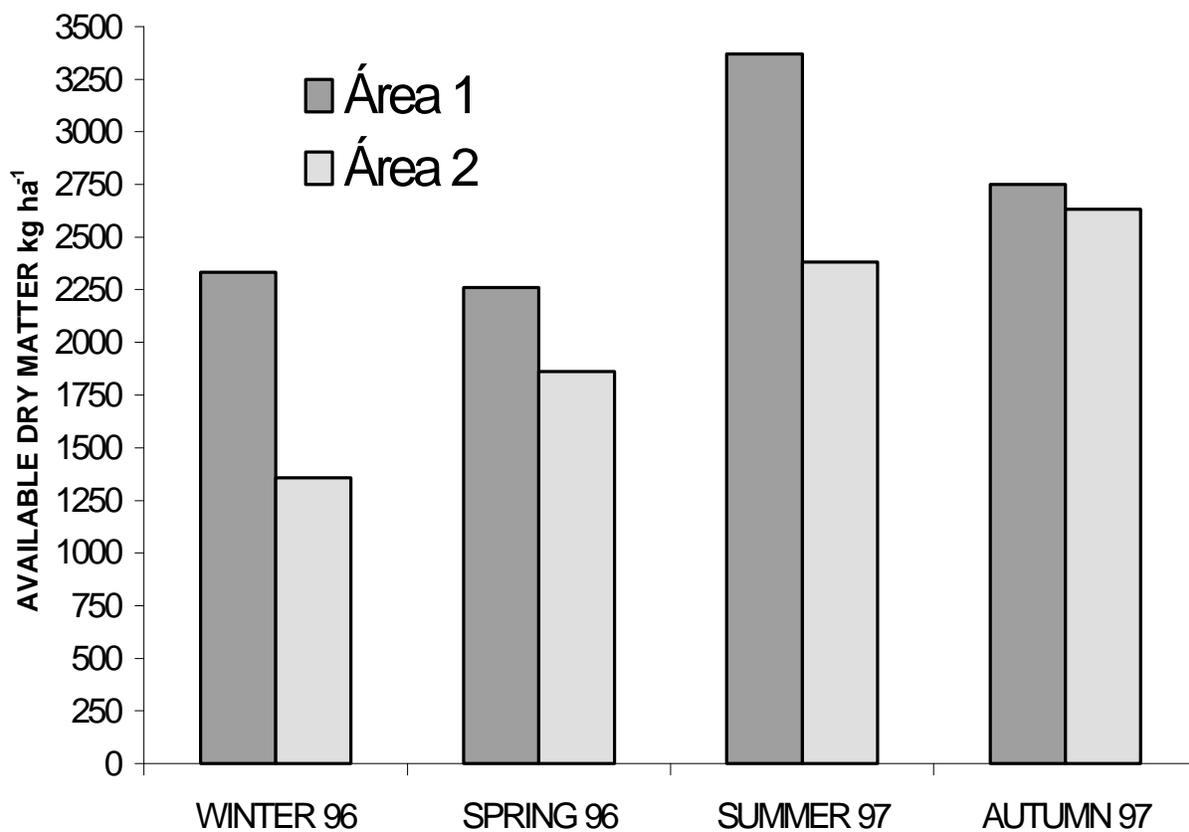


Figure 1 - Seasonal dry matter availability of grazed pastures in areas 1 and 2.