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Herbage accumulation and animal performance on Xaraés palisade grass subjected to intensities of continuous stocking management

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Introduction

Most grass species used in Brazil belong to the genera *Brachiaria* and *Panicum*, with Marandu palisade grass (*Brachiaria brizantha* cv. Marandu) being the main cultivated forage grass (Santos Filho 1996). *B. brizantha* cv. Xaraés was released as an option for diversifying forage species; it has high herbage yield and fast re-growth, favoring high stocking rates and animal productivity (Euclides et al. 2008; 2009). The objective of this study was to evaluate herbage accumulation and animal performance of beef steers grazing continuously stocked Xaraés palisade grass managed at 15, 30 and 45 cm sward height.

Methods

The experiment was carried out at Embrapa Gado de Corte, Campo Grande, MS, Brazil (20º27' S, 54º37' W; 530 m asl). According to Köppen classification (Kottek et al. 2006), the climate corresponds to a transition from Cfa to Aw humid tropical with dry winters. Average annual rainfall is 1,560 mm, with a dry period from May to September (30% of annual rainfall). *B. brizantha* cv. Xaraés (Xaraés palisade grass) was studied from December 2008 to December 2009. Treatments were 3 sward surface heights (SSH, 15, 30 and 45 cm), generated by continuous stocking and maintained on target using variable stocking rates, and were allocated to a complete randomized block design, with 2 replications; paddock size was 0.67 ha. Herbage mass was sampled every 28 days using fifteen 1.0 m^2 quadrats per paddock with cuts made at ground level. All herbage within quadrats was harvested and separated into 2 subsamples. One was dried in a forced-draught oven at 55 °C for 72 hours and then weighed. The other one was hand-separated into the morphological components leaf (leaf lamina), stem (stem + leaf sheath) and dead material. These were also dried in a forced-draught oven, similarly to the total-herbage mass samples, and dry weights used to calculate morphological composition as percentage of total herbage mass. Three test animals per paddock were weighed regularly to determine weight gains, with extra steers used to adjust stocking rate according to the need to maintain treatment specifications.

Results

Plant responses

Herbage mass varied with SSH ($P<0.05$) and corresponded to 1,410, 3,610 and 5,180 ± 66 kg DM/ha on swards managed at 15, 30 and 45 cm, respectively, equivalent to herbage bulk density values of 89, 115 and 115 kg DM/ha/cm. In general, morphological composition of sward herbage mass (percentage of leaf, stem and dead material, and leaf:stem and leaf:non-leaf ratios) was affected by SSH, season of the year and SSH x season of the year interaction ($P<0.05$). The percentage

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of leaf normally decreased with SSH, except during autumn, when there was no difference among treatments.

Animal responses

Animal daily liveweight gain (ALWG) varied with SSH and season of the year (P<0.05) (Table 1). Recorded values were larger on swards managed at 30 cm than on swards managed at 15 and 45 cm (0.50, 0.77 and 0.60 ± 0.04 kg/hd/d for 15, 30 and 45 cm, respectively). There was a clear contrast between rainy and dry seasons, with larger values recorded during late spring, summer and autumn and lower during winter and early spring (0.74, 0.80, 0.45, 0.40 and 0.73 ± 0.04 kg/hd/d for summer, autumn, winter, early and late spring, respectively).

Daily gain per hectare (Table 2) was affected by SSH, season of the year and SSH x season of the year interaction (P<0.05). Treatment differences were small but cumulative, resulting in larger gain per hectare on swards managed at 30 cm at the end of the experiment. For swards managed at 15 and 45 cm, larger values were obtained during summer, lower values during early spring and intermediate values during autumn, winter and late spring. Values were relatively stable throughout the experiment on swards managed at 30 cm. Variations in total weight gain per hectare between treatments were similar to those of ALWG, with values on swards managed at 30 cm being 14 and 26% larger than those recorded on swards managed at 15 and 45 cm, respectively. With the exception of swards managed at 30 cm, weight gain per hectare was largest during summer and lowest during early spring; the difference between these 2 seasons was particularly large on swards managed at 15 cm. This can be explained by variations in changes in ingestive behavior characteristics, particularly intake rate, since under continuous stocking with fixed sward targets, as used in this experiment, animals exploit the top third of the sward canopy, which is comprised almost exclusively of leaf lamina. In this context, variations in chemical composition are not large enough to explain differences in animal performance, indicating that differences are mainly due to variations in intake (Da Silva and Nascimento Jr. 2007).

Conclusion

It is concluded that under continuous stocking management with growing steers, the optimum sward target was 30 cm.

Table 1. Seasonal changes in animal daily liveweight gain (kg/hd/d) on Xaraés palisade grass swards subjected to intensities of continuous stocking throughout the year.

Season of the year	Sward surface height (cm)			Mean
	15	30	45	
Summer	0.74 (0.07)[2]	0.79 (0.07)	0.68 (0.07)	0.74 a[1] (0.04)
Autumn	0.54 (0.11)	1.04 (0.11)	0.82 (0.11)	0.80 a (0.06)
Winter	0.41 (0.07)	0.49 (0.07)	0.44 (0.07)	0.45 b (0.04)
Early spring	0.15 (0.11)	0.55 (0.11)	0.49 (0.11)	0.40 b (0.06)
Late spring	0.66 (0.07)	0.95 (0.07)	0.47 (0.07)	0.73 a (0.04)
Mean	0.50 B (0.04)	0.77 A (0.04)	0.60 B (0.04)	

[1]Overall means followed by the same letters (lower case for seasons and upper-case for sward heights) are not different (P>0.05). [2]Values in parentheses correspond to standard error of the mean (s.e.).

Table 2. Daily weight gains per hectare (kg/ha/d) on Xaraés palisade grass swards subjected to intensities of continuous stocking throughout the year.

Season of the year	Sward surface height (cm)			Mean
	15	30	45	
Summer	4.90 (0.44)[2]	4.20 (0.44)	4.80 (0.44)	4.63 a[1] (0.25)
Autumn	2.32 (0.62)	3.63 (0.62)	2.68 (0.62)	2.88 bc (0.36)
Winter	2.81 (0.44)	2.74 (0.44)	2.17 (0.44)	2.57 bc (0.25)
Early spring	0.86 (0.62)	2.59 (0.62)	1.73 (0.62)	1.73 c (0.36)
Late spring	3.25 (0.44)	4.56 (0.44)	1.92 (0.44)	3.24 b (0.25)
Mean	2.83 AB (0.23)	3.54 A (0.23)	2.66 B (0.23)	
Total for the experiment (kg/ha)	1026 B (15)	1173 A (15)	930 B (15)	

[1]Overall means followed by the same letters (upper case for sward heights and lower case for seasons) are not different (P>0.05). [2]Numbers in parentheses correspond to standard error of the mean (s.e.).

References

da Silva SC; Nascimento Jr D. 2007. Advances in research on tropical forage plants in pastures: Physical and physiological characteristics and grazing management. Revista Brasileira de Zootecnia 36:121−138.

Euclides VPB; Macedo MCM; Valle CB; Barbosa RA; Gonçalves WV. 2008. Produção de forragem e características da estrutura do dossel de cultivares de *Brachiaria brizantha* sob pastejo. Pesquisa Agropecuária Brasileira 43:1805−1812.

Euclides VPB; Macedo MCM; Valle CB; Difante GS; Barbosa RA; Cacere ER. 2009. Valor nutritivo da forragem e produção animal em pastagens de *Brachiaria brizantha*. Pesquisa Agropecuária Brasileira 44:98−106.

Kottek M; Grieser J; Beck C; Rudolf B; Rubel F. 2006. World map of Köppen-Geiger climate classification updated. Meteorologische Zeitschrift 15:259−263.

Santos Filho LF. 1996. Seed production: Perspective from Brazilian private sector. In: Miles JW; Mass BL; Valle CB, eds. *Brachiaria*: biology, agronomy and improvement. Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia; Embrapa Gado de Corte (EMBRAPA-CNPGC), Campo Grande, MS, Brazil. p. 141−146.

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