Grazing site selection by heifers in improved Pampa grasslands

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Introduction

The Pampa Biome feeds 90% of the cattle and sheep in Rio Grande do Sul, Brasil (RS). Most research on this ecosystem has focused on animal production with little attention to plant-animal interactions. Knowledge about plant-animal interactions is necessary to manage the whole system sustainably and to optimize livestock diets in complex environments like natural pastures (Pinto et. al., 2007). We evaluated the relationship between selection of space for grazing by beef heifers and vegetation characteristics of various sites in natural pastures with and without fertilization and overseeding.

Materials and methods

This study was conducted at EMBRAPA Pecuária Sul, Bagé, RS. Two ~7 ha pastures were assigned to each of three treatments: natural grassland (NG), NG plus fertilization (2007: 70 kg ha^{-1} P_2O_5, 2008 100 kg N ha^{-1}, NGF) and NGF overseeded with *Lolium multiflorum* and *Trifolium pratense* (NGFS) in 2007 and 2008. Each pasture was subdivided into 6-8 sites based on topographical position, soils and vegetation. Six Brangus heifers grazed each pasture continuously. Vegetation composition, height and mass, and grazing time of two heifers in site of each pasture were measured in April (fall) and October (spring) 2008. A "forage value" (fv) for each site in each season was calculated by weighting the relative palatability of each species with its relative frequency. Non-metric multidimensional scaling with four ordination axes was applied on the 29 species. Grazing time was evaluated by scan sampling every 10 minutes from dusk to dawn during two consecutive days in each month.

We calculated electivity for each site as in Putfarken et al., (2008) and regressed it on herbage mass and ordination axes. Absolute electivity was aE (abs. value of E).

Results

Grazing time was not significantly different due to treatments (550, 463 and 468 min for NG, NGF and NGFS), but it was significantly greater in October (528±19.5 min) than in April (459±19.5). Conversely, herbage mass was significantly greater in October than in April (P=0.01, 1099 vs. 1448 kg ha^{-1}, s.e.=76.1 kg ha^{-1}), suggesting that herbage availability was not limiting. There was a significant month by treatment interaction (Figure 1) on herbage mass.

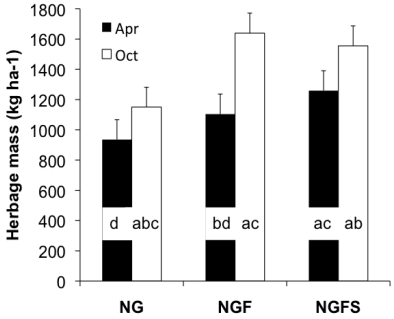

Figure 1. Herbage mass per unit area as a function of season and treatment. Bars without common letters are significantly different with alpha=0.05.

There was a significant interaction of month and treatment on aE (P=0.004). Whereas aE in NGF decreased from April to October (0.43 to 0.34), in NGFS it increased significantly from 0.24 to 0.44. Forage value varied between 0.18 and 0.78 but it did not explain grazing time or electivity. Electivity was inversely related to the first ordination axis in April and directly related to the fourth one in October (P<0.05). The first axis in April represented a gradient of increasing *Paspalum notatum* (r=0.65, n=43) and decreasing *Axonopus affinis* (r=-0.79, n=43), whereas the fourth axis of October was a gradient of *Paspalum notatum* (r=-0.56) and *Axonopus affinis* (r=0.46), indicating that animals selected sites with more *Axonopus affinis* and less *Paspalum notatum* than the average available.

Conclusions

Axonopus affinis appears to be a species strongly selected for or associated with site with desirable characteristics for beef heifers. Fertilization of natural grassland resulted in greater herbage mass than control areas, but the addition of seed did not appear to influence herbage productivity. The impact of seeding and fertilization on forage quality and animal productivity remains to be tested.

References

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