

Plant community structure of midland grassland of the Flooding Pampa in relation to grazing management

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Introduction The impact of grazing on plant community structure and ecosystem functioning is a key issue for range management. Although excessive grazing may often lead to land degradation and loss of biodiversity, maximisation of livestock production requires high stocking rates. The aim of this study was to evaluate the adequacy of intermittent grazing to improve the condition of midland grassland in Flooding Pampa. We compared the responses of functional groups and the changes of species diversity of the plant community over three years under intermittent and continuous grazing regimes.

Materials and methods A 3-year experiment was conducted, from 1993 to 1996. Total annual rainfall decreased from 1465 mm in 1993 to 845 mm in 1996. From March 1989, traditional continuous grazing was replaced by intermittent grazing on four commercial farms located in different sites of the Flooding Pampa. In each site, an adjacent farm with similar traits (total surface, soil type, vegetation communities, land use) managed under continuous grazing was assessed as a control. Average stocking rate in all farms was 1 ha/breeding cow. The pair of farms at each site constituted the replications of the experiment. The proportion of basal cover of different functional groups, litter and bare soil were monitored. Plant species diversity was calculated using Shannon-Wiener diversity index (H'). Analysis of variance (ANOVA) techniques were used to evaluate the effect of grazing method and year on each response variable and to test the significance of differences between H' .

Results Grazing method strongly affected the presence of most functional groups and other structural variables. Basal cover of C_3 annual grasses (Figure 1a) and C_3 perennial grasses (Figure 1b) were higher, while cover of C_4 prostrate grasses (Figure 1c) was much lower under intermittent grazing. Intermittent grazing increased cover of litter (Figure 1f) and reduced the amount of bare soil (Figure 1e). As the years became drier, C_4 tussock grasses tended to decrease (Figure 1d) and C_3 annual and perennial grasses increased (Figures 1a and b) during the experimental period. However, total plant basal cover (avg. 71%) and plant species diversity ($H'=2.61$ for continuous and $H'=2.45$ for intermittent grazing, $p=0.25$) were not affected by grazing method across the years.

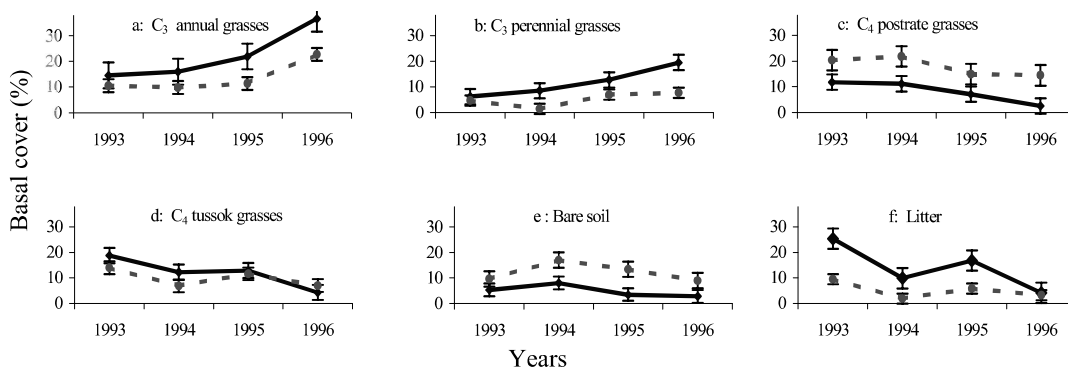


Figure 1 Basal cover of functional groups, bare soil and litter of midland grassland of Flooding Pampa under intermittent grazing (solid line) or continuous grazing (interrupted line). Bars indicate standard errors

Conclusions Intermittent grazing increased the cover of functional groups of high forage value, like C_3 annual and perennial grasses, while total basal cover and community biodiversity were not affected. These changes in community structure imply an improvement in rangeland condition and secondary productivity (Jacobo *et al.*, 2000). These results suggest that productivity and conservation goals may be compatible using this grazing method in Flooding Pampa midlands.

Reference

Jacobo, E.J., A.M. Rodríguez, J.L. Rossi, L.P. Salgado & V.A. Deregibus (2000). Intermittent grazing and production of Italian ryegrass on Argentinian rangelands. *Journal of Range Management*, 53, 483- 488.