

State and transition model of lowland grassland in Flooding Pampa

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Introduction Rainfall conditions are considered to be a major factor in determining vegetation structure in temperate grasslands with grazing playing a secondary role (Biondini *et al.*, 1998; Sternberg *et al.*, 2000). In order to analyse the relative importance of both factors on the lowland community of the Flooding Pampa we compared the responses of functional groups under both intermittent and continuous grazing regimes over a 3-year period of important inter seasonal rainfall variation. The results are presented in a state and transition model.

Materials and methods The experiment was conducted from 1993 to 1996. Total annual rainfall was 1465 mm in 1993, 1156 mm in 1994, 576mm in 1995 and 845 mm in 1996. Since March 1989, traditional continuous grazing was replaced by intermittent grazing in four commercial farms located in different sites of the Flooding Pampa. In each site, a near farm managed under continuous grazing was assessed as a control. Two main classifying effects were examined: grazing method and year and sites were treated as blocks. Average stocking rate in all farms was 1 breeding cow/ha. Proportion of basal cover of different functional groups was monitored. Analysis of variance (ANOVA) was used to evaluate the effect of grazing method and year on each response variable. Specific states and transitions were proposed based upon measurements of the vegetation made over the analysed period.

Results Hydrophytic grasses and sedges dominated this community in the extremely wet year (1465 mm), when water saturation of soils occurred during several month, irrespective of the grazing method. As annual rainfall fell (575 mm), sedges decreased and plant community followed different pathways depending on grazing management: under continuous grazing, C₄ grasses and forbs replaced sedges, whereas under intermittent grazing hydrophytic grasses maintained an important cover and legumes tended to increase (Figure 1).

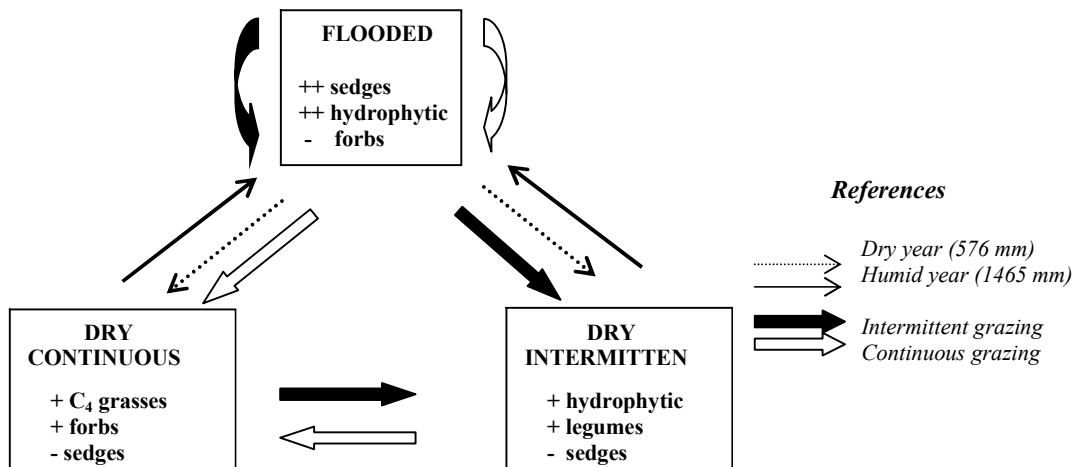


Figure 1 States and transitions of lowland community in the Flooding Pampa

Conclusions Opposing with semi arid grasslands, grazing effect on plant composition in lowland community of Flooding Pampa grasslands was inversely related to annual rainfall. In humid years, grazing method did not change plant composition. In dry years, intermittent grazing promotes functional groups composed of high forage value species, suggesting an improvement in rangeland condition.

References

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