



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Effect of Cattle Grazing on Native Forage Biomass Yield in Extensive Grazing Systems of Southern Bolivia

H. Alzérreca

Herbario Nacional de Bolivia, Bolivia

M. Miranda

Herbario Nacional de Bolivia, Bolivia

Svenja Marquardt

ETH Zurich, Switzerland

Michael Kreuzer

ETH Zurich, Switzerland

Andrea C. Mayer

ETH Zurich, Switzerland

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/10-1/28>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Effect of cattle grazing on native forage biomass yield in extensive grazing systems of southern Bolivia

H. Alzérrecá¹, M. Miranda¹, S. Marquardt², M. Kreuzer² and A. C. Mayer²

¹ Herbario Nacional de Bolivia, La Paz, Bolivia,

² ETH Zurich, Institute of Animal Science, Zurich, Switzerland.

E-mail: alzerrec@iname.com

Key words : animal nutrition, defoliation, grazing intensity, silvopastoral system, Criollo cattle

Introduction Boliviano-Tucumano mountain forests in Southern Bolivia are used for grazing Criollo cattle. Great parts of these grazing areas are located in the nature reserve *Parque Natural de Fauna y Flora Tariquía*. Near the villages, grazing pressure can be high, especially during the rainy season, whereas remote forests are only utilized for grazing in the dry and pre-humid season. Grazing and browsing might affect biomass production of specific plant species in the Boliviano-Tucumano forest, however, this has not been investigated. The objective of this study was to determine the effect of different grazing intensities of Criollo cattle on forage biomass production during the grazing period and in the subsequent year, and the contribution of different vegetation types to the overall forage supply.

Materials and methods The experimental site "El Mesón" (S21° 45' 06", W64° 12' 16") is located at an altitude of 1280 masl near the village of Salinas in the Department of Tarija, Bolivia, and belongs to the Boliviano-Tucumano formation (Navarro and Maldonado, 2004). The annual precipitation is 1,334 mm (need to check this value). Three intensities of grazing were randomly assigned to three plots, 3 ha each. Treatments were: low (L), medium (M) and high (H) grazing intensity, with 0.8, 1.3 and 2.2 animal units/ha, respectively (au=300 kg live weight mature criollo cow). The grazing period in 2006 and 2007 was from March to June. Yield was measured before (PRE) and after the grazing experiments (POS) in both years. Forage was harvested utilizing different techniques according to the vegetation types; in grasslands, all forage plants present in 30 randomly distributed quadrants (0.5 m²) were harvested; in forested areas, the herbaceous plants were harvested in 18 (5×5 m²) quadrants. In shrubs, the reference unit technique was used (Bonham 1989). Data were analyzed utilizing the Mixed model (LS Means) and results were reported in kg of dry matter per ha.

Results Principal forage species were; *Paspalum notatum*, *Panicum laxum* and *Axonopus compressus* in grasslands; *Pseudechinolaena polystachya*, *Pteris deflexa* and *Panicum sp.* in forest; and within the woody plants *Barnadesia odorata*, *Ocotea cf. puberula* and *Allophylus edulis*. Herbaceous species contributed most to the total available forage. POS shows significantly (P<0.05) less defoliation effects for the low grazing intensity plot in both years. The only pre-grazing mean significantly lower than the POS was in the high grazing intensity plot in the second year of the experiment, suggesting a heavy grazing accumulated effect from the previous year. PRE and POS differed significantly, except for the low grazing intensity treatment in the first year of the experiment. On the low grazing intensity plot, the effects of defoliation on biomass production were not severe. In general, on the high grazing intensity plot, herbaceous plants had a significantly lower yield than under medium and low grazing intensity. However, higher yields in these treatments in the second year of the experiment suggest a remarkable re-growth capacity of these plant species. Overall, woody plants contributed less to the forage yield than the herbaceous plant species. Interestingly, there were no significant differences among the plots grazed with different intensities (POS treatments).

Conclusions Grazing intensities higher than applied here could reduce biomass production in subsequent years. However, the herbaceous plant species showed a remarkable resilience capacity when moderate grazing intensities are applied. The result may contribute to decisions regarding the sustainable management of the nature reserve by adapting grazing intensities to the specific conditions of a grazing site, in order to ensure both ecological and economic sustainability.

References

- Bonham, C. D. (1989). Measurements for terrestrial vegetation. John Wiley & Sons. New York, US. 338 p.
- Navarro, G. and Maldonado, M. (2004). Geografía Ecológica de Bolivia: Vegetación y Ambientes Acuáticos. 2nd edition. Editorial: Centro de Ecología Simón I. Patiño-Departamento de Difusión. Talleres de Industrias Graficas SIRENA. Santa Cruz de la Sierra, Bolivia. 719 p.