Broad Spectrum of Plant Species Grazed and Browsed by Cattle in Bolivian Subtropical Mountain Forests

Svenja Marquardt
ETH Zurich, Switzerland

H. Alzérreca
Herbario Nacional de Bolivia, Bolivia

S. Beck
Herbario Nacional de Bolivia, Bolivia

Michael Kreuzer
ETH Zurich, Switzerland

Andrea C. Mayer
ETH Zurich, Switzerland

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Broad spectrum of plant species grazed and browsed by cattle in Bolivian subtropical mountain forests

S . Marquardt[1] , H . Alzérreca[2] , S . Beck[2] , M . Kreuzer[1] , A .C . Mayer[1]
[1] ETH Zurich , Institute of Animal Science , Zurich , Switzerland ; [2] Herbario Nacional de Bolivia , La Paz , Bolivia . E-mail :svenja .marquardt@ inw .agrl .ethz .ch

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Introduction In Southern Bolivia , Department of Tarija , the suptropical Boliviano-Tucumano mountain forests are used as winter grazing areas for cattle by local livestock keepers . When the dry season starts (April/ May) , forage offer declines on the village-near grassland areas where the cattle usually graze during the rainy season , and the cattle are moved to the mountain forests (transhumance system) and stay there until the forage offer of the grasslands in the valleys increase again with the first rainfalls and higher temperatures at the beginning of the rainy season (Oct/Nov .) The subtropical forests provide forage even in the critical dry period and are therefore the only possibility for local smallholders to maintain their herds throughout the whole year . Little knowledge exists concerning the diet of the cattle in these mountain ecosystems . This study investigated plant species selection by cattle during the entire period of cattle grazing and browsing in the Boliviano-Tucumano mountain forests . The results can help to reconcile livestock management and nature reserve conservation .

Materials and methods The study was conducted in two mountain forest areas in the *Reserva Nacional de Flora y Fauna Tariquía* , which are traditionally used for cattle grazing by local livestock herders during the dry and the prehumid season . The natural vegetation type of the region is *Boliviano-Tucumano subandean semideciduous and seasonal evergreen vegetation* (Navarro 2004) , with the predominant tree species belonging to the *Myrtaceae* family . Plant cover and composition was assessed at the beginning of the dry season (bd) , at the end of the dry season (ed) and in the prehumid season (ph) applying a point-line method . Plant selection was determined by direct observations and bite counts . Data collection was realised once a month during May to November in both study sites , by following randomly selected adult female Criollo cattle during 4 to 5 consecutive days during daylight hours . The number of bites per plant species was recorded every 6 minutes during a 1-minute period of actual observation . Based on that , the frequency of selection of all plant species occurring in the area was analysed , and—relating these data to the occurrence frequency of the plant species—a preference ranking of the plant species was performed .

Results The results of the plant cover assessment , with 453 different plant species registered , document the floristic diversity of the study sites within the Boliviano-Tucumano mountain forests . A total of 370 different plant species were grazed and browsed by the cattle in both areas , which means that more than 80% of the plant species occurring in the area were grazed or browsed by the animals during the dry and prehumid period . Despite this broad spectrum of plant species consumed by the cattle , certain species were especially preferred and made up the major part of the diet . The grass *Ichnanthus cf . pallens* contributed more than 20% to the diet of the cattle , with decreasing importance towards the end of the observation period . While some plant species contributed to the diet during the whole observation period , the preference of other plant species differed between seasons . These seasonal selection patterns seemed to be associated with the phenological stage of the respective plant species , as well as with their availability .

Conclusions The results confirm the importance of the subtropical Boliviano-Tucumano mountain forests for local livestock farming . The high plant species diversity found in this ecosystem is reflected in the high number of plants species selected by the cattle . Nevertheless , it becomes apparent that specific plant species were highly preferred , and that their significance changed during the grazing season due to climatic conditions and availability . A detailed evaluation of the forage plant species is needed , especially concerning their nutritional value and their occurrence and spatial distribution . Furthermore , the ecological role of the most preferred plant species and their reaction on the elevated grazing pressure should be further evaluated , as well as their capacity of regeneration and reproduction . Both , local livestock herders and nature conservationists can profit from the results of this study regarding preference for and pressure on the different plant species occurring in the *Boliviano-Tucumano subandean semideciduous and seasonal evergreen vegetation* .

Reference

Navarro , G . (2004) . Provincia Biogeográfica Boliviano-Tucumana . Chapter 8 . , p . 351-451 . In : Navarro , G . , Maldonado , M . *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 .