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“Development on the margin”

## Grazing Patterns in Relation to Grazing Intensity and Management System

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### Abstract

The selective grazing of sheep influences sward structure by inducing heterogeneous vegetation patterns that differ in sward height. For example some areas are favoured by sheep, and others are permanently avoided by them. Those pastures exposed to high grazing pressures have an increased risk of degradation, especially in semiarid grassland. However, overgrazed patterns can also be found in plots with low grazing intensity and are not only related to stocking rate but also to the management system. The present study investigates the effect of different grazing intensities and management systems on grazing patterns.

The study site is located in the semi-arid, native grassland within the Xilin River catchment, Inner Mongolia Autonomous Region, P.R. China (43°38' N, 116°42' E). In two replicates three different grazing intensities and two different management systems were tested. In the Mixed System (MS), annual alternation between grazing and hay making was applied, while in the Traditional System (TS) the same area was always used either only for grazing or hay making. The 2-ha sizing plots were structured with a 10 m × 10 m grid to analyse the vertical and horizontal distribution of the vegetation. The grazing patterns were assessed by height × density measurements at each 10 × 10 m grid point using a Rising-Platometer (GRASTEC). Data were georeferenced and digitised.

High grazing intensity led to lower heterogeneity compared to the less intensively grazed plots. The biomass distribution maps illustrate overgrazed patterns (*i.e.* areas of low vegetation cover) in low grazing intensity plots. Patterns were more heterogeneous in the TS compared to the MS. This behaviour led to highly overgrazed patterns resulting in rising heterogeneity in the TS. Annual alternation between hay-making and grazing reduced such heterogeneity in the MS.

The vertical and horizontal structure of plant biomass was influenced by both grazing intensity and management system. The MS was more homogenous in terms of aboveground biomass distribution with less pronounced heterogeneous grazing patterns. These results suggest that management system may be as important as grazing intensity for sustainable management of semiarid grasslands.

**Keywords:** Grazing pattern, semiarid grassland, sheep grazing, vegetation maps