

A test of grazing experimental design and grazing effects in a mixed grassland ecosystem

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Introduction Most of grazing experimental designs are based on an assumption that the grassland condition of experimental areas are similar before the grazing experiments carried out. Therefore, any changes between different grazing intensities are contributed to grazing effects. Sparse researches test the assumption due to difficulty in finding a large, no grazing disturbance and natural grassland area. The grazing induced changes are difficult to clarify with these grazing experiment designs. Hence, it is important to validate the grazing experiment design before the experiment carried out and assess the grazing impact based on a proper experiment design.

Materials and methods Four grazed plots from provincial community pastures in conjunction with nine ungrazed plots located in the grazing experimental sites of Grasslands National Park are applied for this study. Field data (Leaf area index) combining with remote sensing data (three SPOT multiple scenes) are employed. To validate the grazing experiment design and to analysis the grazing effects, one way ANOVA and coefficient of variance (CV) are performed. The relationship between Leaf area index and atmosphere adjusted soil adjusted vegetation index is built by linear regression model.

Results and discussion The results are as follows: 1) baseline condition of the grazing experiment site is not uniform before the grazing experiment is carried out; 2) remote sensing data have limit capability to detect the change within grazing experiment area; 3) grazing in this area is not caused significant change; however, the grassland heterogeneity in grazed area is higher than that of ungrazed area; 4) significant difference are found during three year period both in ungrazed and grazed area.



Figure 1 Study site and experimental design.

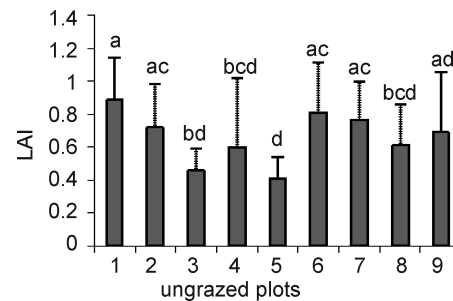


Figure 2 LAI within the ungrazed area in 2007.

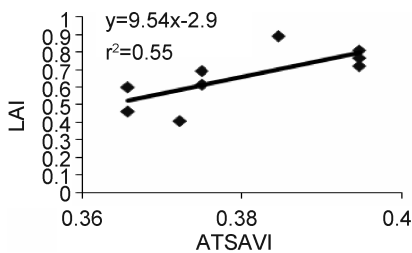


Figure 3 Relationship between LAI and ATSAVI.

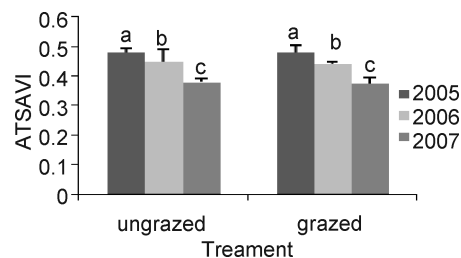


Figure 4 ATSAVI change during three years.

Study site and parts of result figures

Conclusions Good experimental design is needed to minimize the influence of uniform grassland baseline and spatial data have limit in catching the tiny change of grassland. Grazing does not cause significant change in this area and is not the only factor affecting grassland in grazed area.