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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

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## Study on community $\beta$ -diversities of different grazing systems in a desert steppe environment

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**Key words:** desert steppe, continuous grazing, rotational grazing,  $\beta$ -diversity

**Introduction** Plant community diversity is composed of community composition and dynamic diversification (Xie Yingzhong, 1999). For the relationships of prairie plant community diversity and grazing, there has been a substantial amount of research conducted (Grimes J P, 1973; Huston M. A, 1979), but there are very few studies on the change process of grassland community plant diversity in different grazing systems. Knowledge about the changes of plant diversity of desert grassland communities under different grazing systems can lay a foundation for further in-depth study on eco-functions of desert grassland community biodiversity.

**Materials and methods** The study site was located in *Stipa breviflora* desert steppe in Sunit Right Banner of Inner Mongolian ( $42^{\circ}16'26''N$ ,  $112^{\circ}47'17''E$ ). Annual-mean temperature is  $6.2^{\circ}C$  and average precipitation is 209.12 mm. Dominant vegetation is the community of *Stipa breviflora* and *Cleistogenes songorica* and *Allium polyrhizum*. The experimental treatments were composed of a continuous grazing plot of  $340\text{ hm}^2$ , a rotational grazing plot of  $320\text{ hm}^2$  divided into 8 smaller, equally sized plots and a grazing exclusion plot of  $1\text{ hm}^2$ , which has not been grazed since 1999. Stocking rate on grazing plots was 1.25 sheep/ $\text{hm}^2$ . Plant community  $\beta$ -diversity was measured. Statistical analysis software SAS8.2 and EXCEL2003 were used to analyze data for this research.

**Results and discussion** The index of community  $\beta$ -diversity decreased with increasing quadrat size (Figure 1). Three treatments did not differ significantly with the same sample size on Desert Steppe ( $p > 0.05$ ). The highest index of  $\beta$ -diversity was in rotational grazing treatment. This may be because there was certain leisure time in rotational grazing, so the plant growth accelerated and vegetation cover increased. This may have led to a higher  $\beta$ -diversity index in the rotational grazing plot. The results showed that community structure is relatively complex and stable on a certain extent in rotational grazing system.

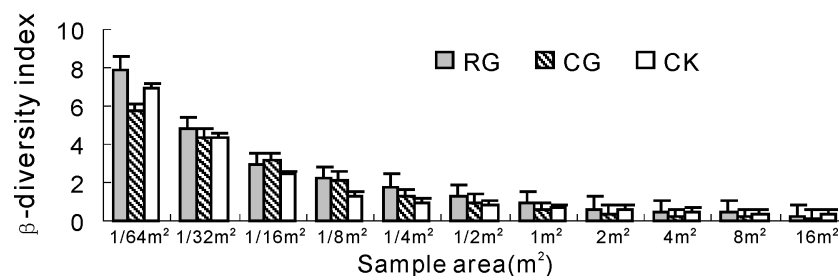


Figure 1 Community  $\beta$ -diversity under different grazing system.

**Conclusions** Community  $\beta$ -diversity index decreases with the increasing quadrat size. The highest index of  $\beta$ -diversity was observed under a rotational grazing system.

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