Influence of Grazing Pressures on Belowground Biomass and Productivity in Mongolia Steppe

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Grazing, as one of disturbing factors of human activities, imposes influences on grassland ecosystem through the behavior of feeding, tramping and excreting from animals. These influences give the effect on aboveground of plants and soil in grassland ecosystem, consequently on matter production and distribution of grassland ecosystem, resulting in the change of belowground biomass and productivities. This study aims to discuss the effect of grazing on belowground biomass and productivities of grassland ecosystem in Mongolia Steppe

The study was conducted on the grassland belt in kherlen river basin in Mongolia. The dominant plant species mainly included Artemisia adamsii, Artemisia frigida, Stipa krylovi, Cleistogenes squarrosa, Leymus chinensis, Stellaria sp. Potentilla bifurca, Allium tenuissimum. In October 2002 the enclosure with the area of 200m*100m was established for prohibiting grazing. The belowground biomass and productivity in grazing-free plot within the enclosure and grazing plot outside the enclosure were investigated during the period from June 2003 to Sep. 2003.

The results showed that belowground biomass in grazing free plot averaged 2071.774 g dw. m-2 yr-1 in which living biomass accounted for 56.4% and dead biomass accounted for 43.6%; the belowground biomass of grazing plot averaged 2032.568 g dw. m-2 yr-1 , in which living biomass occupied 54.9% and dead biomass occupied 45.1%. The protection through prohibiting grazing showed no significant influence on belowground biomass. The vertical distribution of belowground biomass decreased exponentially with the increasing of soil depth. The belowground biomass mainly distributed in 0-30 cm soil depth. During the growing season (from June to September) the accumulated belowground biomass was 187.266 g dw. m-2 yr-1 and 147.612g dw. m-2 yr-1 in grazing free plot and grazing plot respectively. The belowground growth amount in grazing free plot was significantly higher than that in grazing plot, which illustrated that protection from prohibiting grazing can raise belowground growth amount of grassland ecosystem. At the same time, litterbag method was used to measure decomposition rate of belowground litter. Weight loss rate of litter decomposition was only 17% within 105 days after the experiment was conducted. No significant difference of decomposition rate between grazing free plot and grazing plot was found.