

## Physiological Responses of Dominant Grassland Species to Different Grazing Intensity in Inner Mongolia, China

**Authors :** Min Liu, Jirui Gong, Qinpu Luo, Lili Yang, Bo Yang, Zihong Zhang, Yan Pan, Zhanwei Zhai

**Abstract :** Grazing disturbance is one of the important land-use types that affect plant growth and ecosystem processes. In order to study the responses of dominant species to grazing in the semiarid temperate grassland of Inner Mongolia, we set five grazing intensity plots: a control and four levels of grazing (light (LG), moderate (MG), heavy (HG) and extreme heavy grazing (EHG)) to test the morphological and physiological responses of *Stipa grandis*, *Leymus chinensis* at the individual levels. With the increase of grazing intensity, *Stipa grandis* and *Leymus chinensis* both exhibited reduced plant height, leaf area, stem length and aboveground biomass, showing a significant dwarf phenomenon especially in HG and EHG plots. The photosynthetic capacity decreased along the grazing gradient. Especially in the MG plot, the two dominant species have lowest net photosynthetic rate (P<sub>n</sub>) and water use efficiency (WUE). However, in the HG and EHG plots, the two species had high light saturation point (LSP) and low light compensation point (LCP), indicating they have high light-use efficiency. They showed a stimulation of compensatory photosynthesis to the remnant leaves as compared with grasses in MG plot. For *Leymus chinensis*, the lipid peroxidation level did not increase with the low malondialdehyde (MDA) content even in the EHG plot. It may be due to the high enzymes activity of superoxide dismutase (SOD) and peroxidase (POD) to reduce the damage of reactive oxygen species. Meanwhile, more carbohydrate was stored in the leaf of *Leymus chinensis* to provide energy to the plant regrowth. On the contrary, *Stipa grandis* showed the high level of lipid peroxidation especially in the HG and EHG plots with decreased antioxidant enzymes activity. The soluble protein content did not change significantly in the different plots. Therefore, with the increase of grazing intensity, plants changed morphological and physiological traits to defend themselves effectively to herbivores. *Leymus chinensis* is more resistant to grazing than *Stipa grandis* in terms of tolerance traits, particularly under heavy grazing pressure.

**Keywords :** antioxidant enzymes activity, grazing density, morphological responses, photosynthesis

**Conference Title :** ICEEBS 2017 : International Conference on Ecological, Environmental and Biological Sciences

**Conference Location :** Montreal, Canada

**Conference Dates :** May 11-12, 2017