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Changes in inorganic ion accumulation and growth of *Leymus chinensis* community along the retrogression on the Songnen grassland in northeastern China

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Key words: *L. chinensis*, retrogressive succession, salinity and alkalinity gradients, inorganic ion accumulation, quantitative characteristics

Introduction Songnen grassland is one of the main districts in which Chinese saline-alkali soil concentrates. *L. chinensis* community grassland occupies 65% of total grassland area in the Songnen Plain. The strong rhizomes of *L. chinensis* adapt to saline-alkaline and dune conditions. Through Na^+ , K^+ , Ca^{2+} , Cl^- , NO_3^- , SO_4^{2-} accumulation and ratio, we tried to find the adaptability of *L. chinensis* growing naturally along the grassland retrogressive process.

Material and methods This research was conducted in the grassland ecosystem experimental station of NENU ($44^\circ 30' - 44^\circ 45' \text{N}$, $123^\circ 31' - 123^\circ 56' \text{E}$). Five plots were selected for sampling, according to the different degree of retrogressive succession. In the middle ten days of July, the full expanded leaves, rhizomes and soil samples of each plot were collected to measure pH, EC, Na^+ , K^+ , Ca^{2+} , Cl^- , NO_3^- and SO_4^{2-} . Using routine methods, the density, height, and biomass of *L. chinensis* community were determined (Shi lianxuan, 2006).

Results Along the salinity and alkalinity gradient, the soil pH and EC significantly increased. Plant density, height, dry mass, and underground dry mass of *L. chinensis* community were determined in different retrogressive stages, and they were significant and negatively correlated with the soil pH and EC (Figure 1). Along with the retrogression, Na^+ , Cl^- and NO_3^- of leaves were increased; K^+ , Ca^{2+} and SO_4^{2-} were decreased. Contrarily, K^+ , NO_3^- and SO_4^{2-} of rhizomes were significantly increased (Figure 2). Through analyzed SA and ST, it retained a steady-going level during the plot 2, plot3 and plot 4 (Peng Yanhui 2004).

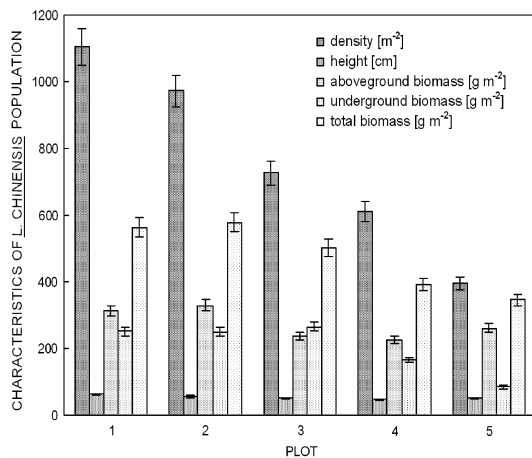


Figure 1 Changes in quantitative characteristics of *L. Chinensis* community.

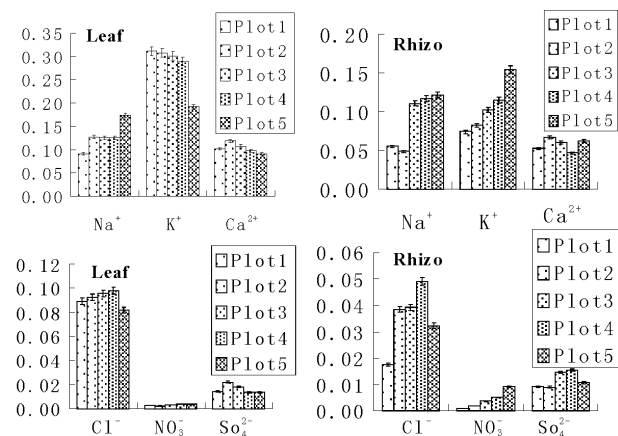


Figure 2 Changes in inorganic ion accumulation of *L. Chinensis* along retrogression on the Songnen grassland. Unit: ($\text{mmol} \cdot \text{g}^{-1} \text{DW}$).

Conclusions The rhizome of *L. Chinensis* could selectively absorb K^+ , not Na^+ in the certain salinity and alkalinity gradient. In the same way, *L. Chinensis* could specially transport K^+ from the rhizome upto the plant, and restrain Na^+ . Furthermore, *L. Chinensis* could accumulate Cl^- and NO_3^- in leaves and rhizomes, so that can resist the stress of Na^+ . (Yanhui Peng 2004)

References

- Yanhui Peng, Yafang Zhu, Yongqiang Mao, Suomin Wang, Weiai Su and Zhangcheng Tang (2004). Alkali grass resists salt stress through high K^+ and an endodermis barrier to Na^+ . *J. Exp. Bot.* 55: 939-949.
- Lianxuan Shi, Jixun Guo (2006). Changes in photosynthetic and growth characteristics of *Leymus chinensis* community along the retrogression on the Songnen grassland in northeastern China. *Photosynthetica*, 44(4): 542-547.