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The comparison of photosynthetic physiological characteristics between *Leymus chinensis* and *Leymus secalinus* in the Songnen plains

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Keywords: *Leymus chinensis*, *Leymus secalinus*, responses of photosynthesis to light and CO₂, photosynthetic rate, transpiration

Introduction *L. chinensis* and *L. secalinus* distributed widely in Songnen grassland, they could adapt to the habitats of different salinity and alkalinity gradient. The research of photosynthesis of *L. chinensis* or *L. secalinus* had great progress, but there no report about compare their photosynthetic characteristics. In this study, we tried to find some evidences for comparing and determining their photosynthetic physiological characteristics (Wang *et al.*, 2001).

Materials and methods Seeds of *L. chinensis* and *L. secalinus* were planted in the same plot in the Songnen plains in 2006. Photosynthetic rate (P_n) and transpiration (E) through responses of photosynthesis to light and CO₂ were determined by LI-6400 in Sept., 2007. During observation the range of photosynthetic photon flux density (PPFD) was 100 to 1600 ($\mu\text{mol} \cdot \text{m}^2 \cdot \text{S}^{-1}$) and changing cellular CO₂ concentration (Ci) be controlled by 12 gram CO₂ cylinder between 100 and 1600 ($\mu\text{mol} \cdot \text{mol}^{-1}$) (Chen *et al.*, 2006).

Results The daily changes trend of P_n of *L. chinensis* and *L. secalinus* were similar it shows classical two-peak type. With the light or CO₂ concentration rising, it is clearly see that the P_n of them was increasing firstly, following reach the peak, and then keep in the same level no matter how the light or CO₂ concentration changed. The CO₂ saturation or compensation point of *L. secalinus* is notable higher than *L. chinensis* in photosynthetic response to CO₂ measuring. But the E of *L. chinensis* is obviously lower than *L. secalinus* both in figures of responses of photosynthesis to light and CO₂ (Figure 1).

Conclusions There were remarkable linear correlation between changes of light use efficiency or transpiration and changes of PPFD or CO₂ concentration in this study. For the plant, the high P_n could help it accumulate more organic compounds, but it is not the only character for determine the competitive and existent capacity. In the drought and semiarid area, water is one of the most important limited factors for plants lived, so E should be the key character for plant. E of *L. chinensis* is notably higher than *L. secalinus* in this studied, these evidences and data revealed *L. chinensis* has more competitive capacity and adaptive live in the Songnen Plains than *L. secalinus*.

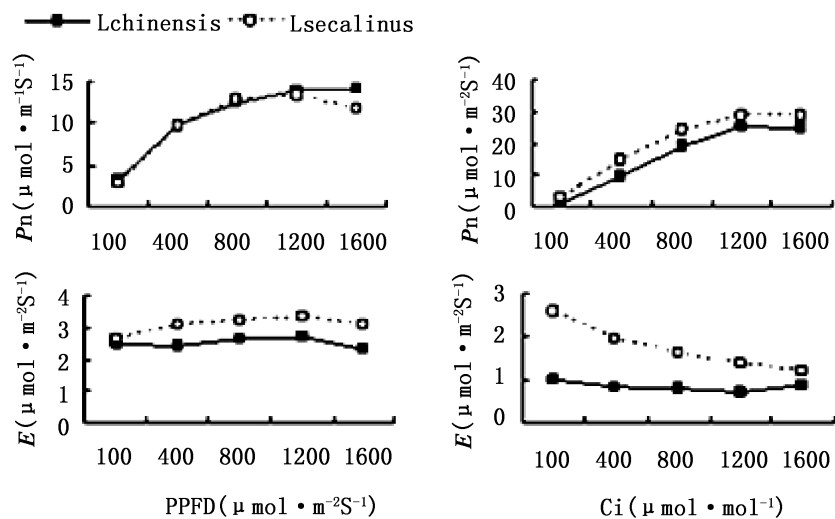


Figure 1 Effects of P_n and E induction on response of photosynthesis to light in two species leaves at $380 \mu\text{mol} \cdot \text{mol}^{-1} \text{CO}_2$, and comparison of two curves of P_n and E photosynthetic response to CO₂ in leaf, observations were measured at $1200 \mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ photons.

References

- Chen, G. Y., YU, G. L., Chen, Y., Xu, D. Q., (2006). Exploring the observation methods of photosynthetic responses to light and carbon dioxide. *Journal of Plant Physiology and Molecular Biology*, 32, 691-696.
- Wang, Y., Zhou, G. S., (2001). Analysis on ecophysiological characteristics of leaf photosynthesis of *Aneurolepidium chinense* in Songnen grassland. *Chinese journal of applied ecology* 12(1): 75-79.