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The XXI International Grassland Congress / VIII 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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Effect of drought stress on the viability of wild *Lespedeza dahurica* seeds

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Key words: *Lespedeza dahurica* population, polyethylene glycol, seed vigor, drought stress

Introduction *Lespedeza dahurica* is drought tolerant with high feeding value (Clewell, 1964). In order to evaluate the drought tolerance of five *lespedezas* from different regions in Shanxi province, the relative germination rate and the growth rate were studied under water stressed conditions. The geographic variation of resistances was also analyzed.

Materials and methods Germination of *Lespedeza* seeds was carried out on the filter paper at 24°C under simulated drought stress with polyethylene glycol (PEG-6000). The water potential was calculated according to Michael's (1983) empirical formula: $\Psi_s = 1.29[\text{PEG}]^2 T - 140[\text{PEG}]^2 - 4[\text{PEG}]$, (Ψ_s is the water potential of PEG solution (bar), $[\text{PEG}]$ is the density of PEG [$\text{g} \cdot \text{g}^{-1}$ (water)], T is temperature (°C)). The concentration of PEG-6000 solution was 0%, 4%, 8%, 12%, 16%, 20%, 24% (w/v). The number of germinated seed in the eighth day was recorded. Ten seedlings from each replicate were harvested for measuring the shoot length. Data of 0 percent density was the radix, The relative germination rate of the PEG treatments were calculated based on the 0% PEG control. The relative value was statistically analysed (Lu *et al.*, 2007).

Results The relative germination rates of five seed sources increased sharply as the initial PEG concentration rose. It peaked at the density of 8% PEG. The seed from Yangquan and Jiaokou can even germinate at 20 percent PEG, but no seeds can germinate at 24 percent PEG solution (Figure 1). The relative growth rate of five seed sources slightly decreases as the PEG concentration increased on the whole. (Figure 2)

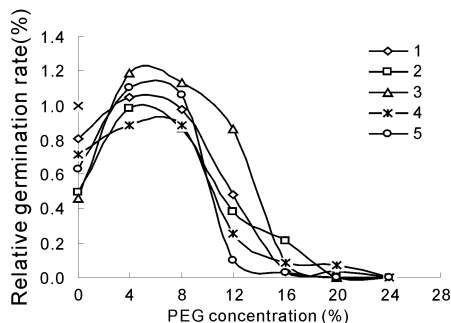


Figure 1 Relative germination rate under PEG.

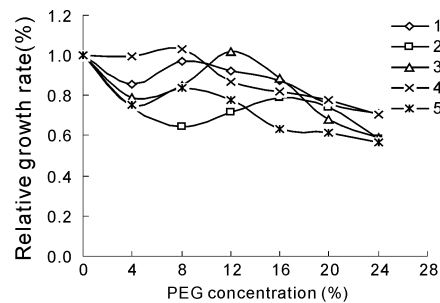


Figure 2 Relative growth rate under PEG.

Conclusions The *Lespedeza* seeds from five different geographical regions of Shanxi province varied in their tolerance to drought stress. Seeds from Yangquan and Jiaokou had higher drought tolerance because of longer frost-free period and higher latitude in these two regions. Seed from Youyu showed the lowest tolerance because the mean annual rainfall is the maximal.

References

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