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## Evaluation of germplasm of *Leymus chinensis* in north of China

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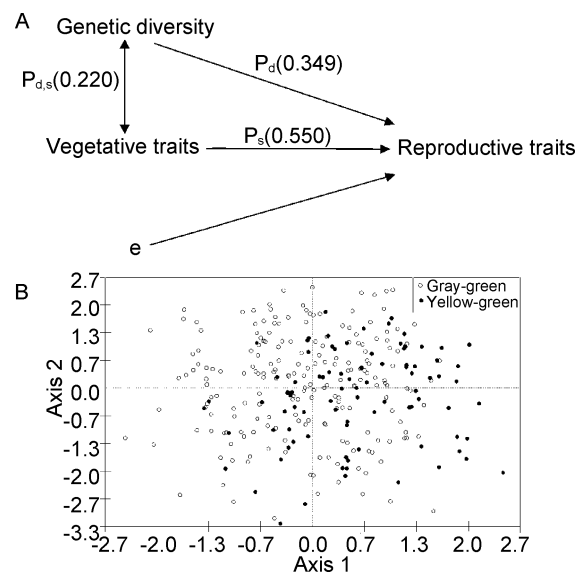
**Key words:** native species, *Leymus chinensis* germplasm, biodiversity, Shannon index

**Introduction** *Leymus chinensis* (Trin.) Tzvel., belongs to family *Gramineae*, tribe *Hordeae*, subtribe *Triticieae*, genus *Leymus* and it is a perennial rhizome grass composed of yellow-green ecotype and grey-green ecotype according to the leaf color (Wang et al., 2005). It is widely distributed throughout the eastern end of the Eurasian steppe, including the westward of North Korea, Mongolia, and the north-westward of Siberia, and is centered in northeastern China. This species also has a very broad distribution in China as a dominant or co-dominant plant. It grows across diverse soil and climate conditions such as the Songliao Plain, the Inner Mongolia Plateau, and the Loess Plateau. On the other hand, such a broad geographical distribution and diverse growing environments contribute to the plentiful genetic diversity of *L. chinensis*.

**Materials and methods** We have collected 293 *L. chinensis* accessions, including 205 grey-green accessions and 88 yellow-green accessions from six provinces in China since the middle 1990s. In this study, genetic diversity in 37 morphological characters of 293 accessions was assessed in three successive years. Based on the 10 qualitative traits and 27 quantitative traits, the genetic diversity index (Shannon index) of traits and geographical populations, the principal coordinate analysis and the path analysis were employed.

**Results** The results of this part were presented as following: (1) Compared to yellow-green type of *L. chinensis*, grey-green type had more variation with significant difference ( $P < 0.05$ ). Combining with the distribution of the two divergent types of clonal populations of *L. chinensis*, it can be concluded that there are stable genetic differentiation between the two divergent types; (2) Path analysis suggested that the combined effects of genetic diversity and vegetative traits could explain 20.6% of the total variation of plant reproductive traits (Figure A); and (3) The highest Shannon genetic diversity index of accessions ( $H = 2.252$ ) was observed in accessions from the region of 124-128° E longitude, suggesting the most abundant germplasm of *L. chinensis* in this region (Figure B).

**Conclusions** Grey-green type of *L. chinensis* had more significant variation than yellow-green type. The genetic diversity and vegetative traits could explain 20.6% of the total variation of plant reproductive traits. The region of 124-128° E longitude, had the most diverse germplasm of *L. chinensis* in China.



**Figure A:** Path diagram showing the effect of genetic diversity and vegetative traits on *L. chinensis* reproductive traits. **B:** PCO case scores (Euclidean) of morphological traits in a collection of 293 *Leymus chinensis* accessions. The cumulated percentage of axis 1 and axis 2 is 60.45%.