

Growth adaptability and foreign gene stability of *TaLEA* transgenic *Populus simonii* × *nigra*

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Abstract: Improving survival rate of afforested species is essential for forest production in saline–alkali areas. Transgenic hybrid poplars could provide potential genetic materials for adaptation to the semi-arid areas. We investigated the growth stability and adaptability of 9-year-old *TaLEA* transgenic lines of *Populus simonii* × *nigra*, as well as position of T-DNA insertion and stability of exogenous genes. Transgenic poplar field trials were carried out using a multi-site joint analysis. Molecular characteristics and the T-DNA insertion sites were identified by genome resequencing. The XL-9, XL-7 and XL-13 preferred lines consistently showed the highest and most stable growth across three testing sites. The exogenous gene was integrated into the genome chromosome and was expressed normally in XL-1, XL-7 and XL-9 lines after 9 years. XL-9, XL-7 and XL-13 are the preferred lines for subsequent production tests. Transgenic hybrid poplar lines can be selected for adaptability in 2 years after field experiments. The results of this study will provide further guidance for testing of transgenic trees for future forest production.