Genetic Diversity of Orchardgrass Germplasm Detected by Molecular Markers

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Genetic diversity of orchardgrass germplasm detected by molecular markers

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Introduction Orchardgrass(*Dactylis glomerata* L) is one of the most important grasses in temperate zones with high forage yield and good quality . In this study we investigated the genetic diversity in 60 orchardgrass accessions with a combination of three molecular markers : AFLP (Amplified fragment length polymorphism) , ISSR (Inter-simple sequence repeat) and RAPD (Random amplified polymorphic DNA) .

Materials and methods Sixty DNA samples were extracted from accessions by the CTAB method . Nine AFLP primer pairs were used in genetic diversity analysis based on Vos's AFLP protocol and PCR reaction system (Vos et al , 1995) .Twelve ISSR primers and twenty RAPD primers were used for farther analysis , the protocol and PCR reaction system were from Wang (2003) and Kölliker (1999) , respectively . All the fragments from three markers were scored manually for band presence (1) or absence (0) .The resulting data matrix was analyzed by NTSYS-pc 2 .1 .

Results According to the analysis of three molecular markers , the following results were obtained : (1) A total of 400 AFLP DNA fragments were amplified , among which 336 (84 .0%) were polymorphic . Genetic similarity coefficient (GS) ranged from 0 .5786 to 0 .9308 among accessions , suggesting rich genetic variation , especially in Chinese accessions . According to the AFLP marker , the genetic variation of orchardgrass accessions was closely associated with ploidy levels and geographical distributions . (2) 116 bands were produced in ISSR analysis , of which 101(87 .07%) were polymorphic . The GS ranged from 0 .6116 to 0 .9231 , which showed rich genetic diversity among accessions . ISSR dendrogram could reveal the geography distribution of orchardgrass . (3) 120 bands were produced in RAPD marker and 97 (80 .83%) were polymorphic . The GS ranged from 0 .6154 to 0 .9254 , also showing a high level of diversity in orchardgrass .

Conclusions The PCR products showed abundant Genetic polymorphism by three molecular markers , and the genetic comparability analysis suggested rich genetic diversity of orchardgrass germplasm , which was consistent with Kölliker research result (Kölliker 1999) . Three molecular markers were considered useful tools for evaluating the genetic diversity for orchardgrass . However , AFLP detected more variance and revealed ploidy levels of accessions , which suggested AFLP marker could be better for genetic diversity research .

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