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Establishment of Ac/Ds-Mediated Gene Tagging Systems in Indica Type Rice

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Objectives

To dissect polymorphic characters among different cultivars at the molecular and genetic levels,
we have been working on Ac/Ds-mediated gene tagging systems in Indica type rice

Materials and Methods

1. Material
   Rice cultltivars used - IR 72 (Indica), Milyang 23 and MGRI 079 (Indica/Japonica)
2. Methods
   IR 72 and MGRI 079 : transformed with Agrobacterium carrying Ac and Ds T-DNA vector
   Milyang 23 : recurrently backcrossed with Ac and Ds lines of Japonica type rice, Dongjinbyeo.

Results and Discussion

Due the extensive genomic sequence information from Japonica type (Nipponbare) and Indica type (GLA) rice genomes, more detailed polymorphisms have been described between these two different cultivars. Around 16% of the indica and japonica genome was not alignable due to deletions and insertions. Even aligned sequences showed substantial differences that resulted from SNPs (single nucleotide polymorphism) and InDels (insertion-deletion polymorphism). Therefore, such sequence diversity should be responsible for differences in many gene expression patterns and agronomical characters.

To dissect polymorphic characters among different cultivars at the molecular and genetic levels, we have been working on Ac/Ds mediated gene tagging systems in Japonica and Indica type rice. To establish the tagging system in indica genetic background, IR72(Indica) and MGRI079(Indica/Japonica) were transformed with Agrobacterium carrying Ac and Ds T-DNA vectors. Among transgenic lines, we successfully identified one single copy Ds line and Ac lines in MGRI079. Also, Ac and Ds lines of Japonica type rice, Dongjinbyeo. were recurrently backcrossed to Milyang23(Indica/Japonica). These lines will be served as 'starter lines' to mutagenize Indica genetic background. To achieve rapid, large scale generation of Ds transposant lines, MGRI079 seeds carrying homozygous Ac and Ds will be subject to plant regeneration. Among R1 generation, more than 70% plants should carry transposed Ds. We expect more than 10,000 Ds independent lines in each year from year 2004. These materials and their genetic information will be open to the public and distributed from year 2005.

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