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论文

应用SSR标记对小豆种质资源的遗传多样性分析

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摘要：

利用24对SSR引物对158份栽培小豆及18份野生小豆资源进行遗传多样性分析。结果表明，栽培小豆的遗传变异水平显著低于野生小豆，其中18对引物在栽培小豆中能检测到多态性，平均等位变异数为3.0个，21对引物在野生小豆中能检测到多态性，平均等位变异数为2.6个。栽培小豆种质间平均遗传相似性系数为0.724，野生小豆间为0.605。基于类平均法的聚类分析可以将栽培小豆和野生小豆区分开，这与主坐标分析的结果基本吻合。不同来源的栽培小豆群体间也有一定的遗传分化。SSR分析不仅验证了小豆品种间的遗传背景与其系谱来源相吻合，而且揭示了同名种质天津红小豆之间的遗传差异。本研究为我国小豆种质资源育种及SSR标记在小豆多样性分析、基因标记、品种鉴定等工作提供了信息。

关键词： 小豆 SSR 遗传多样性

Genetic Diversity of Adzuki Bean Germplasm Resources Revealed by SSR Markers

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Abstract:

Adzuki bean, originated from China, is either one of traditional exports or an important crop for agricultural structure adjustment. As the traditional varieties can not meet the demands of modern markets and the genetic bases of the cultivars have been narrow, it is necessary to develop new breeding materials or novel germplasm, to improve varieties of adzuki bean. China has a collection of over 5 000 adzuki bean resources, which is lacking in study and use in breeding. In the paper, genetic diversity of 158 accessions of cultivated and 18 wild types of adzuki beans were analyzed by using 24 pairs of SSR primers. The results showed that 18 pairs of SSR primers were detected to be polymorphic in cultivated adzuki beans and 21 in wild adzuki beans. The average number of allele (NA) per SSR locus for cultivated and wild adzuki beans was 3.0 and 2.6, respectively. The number of accessions used for cultivated and wild adzuki beans differed much, and the NA and genetic diversity index (polymorphic information content, PIC value) showed a higher genetic variation in wild types than in cultivated ones. Both cluster and principal coordinate analysis (PCO analysis) suggested that there was a high genetic differentiation between cultivated and wild adzuki beans, while cultivated adzuki beans from different provinces of China could not be distinguished from each other clearly, suggesting that there is a high rate of the gene exchange among local adzuki beans. The genetic backgrounds of the breeding cultivars revealed by SSRs are almost agreeable with their putative pedigree, indicating that these SSRs can be used to identify the genetic relationships of them, and used in marker-assist-selection (MAS) in breeding. The results also revealed that the adzuki bean germplasms occurred more than once with the same name in the National Germplasm Conservation Centre were different from each other in genetic background and so valuable to be conserved and used individually. The present study not only provides some informations in adzuki bean breeding, but can accelerate the application of SSR markers in diversity analysis, gene tagging and identification of new cultivars.

Keywords: Adzuki bean SSR Genetic diversity

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