作物学报 2005 31 (9): 1157-1161 ISSN: 0496-3490 CN: 11-1809/S

研究论文

苜蓿耐盐基因分子标记的筛选及鉴定

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收稿日期 2004-3-22 修回日期 2004-12-26 网络版发布日期 接受日期

摘要 以耐盐苜蓿×敏盐苜蓿组合的F2群体为试验材料，利用改良BSA法筛选与苜蓿耐盐基因紧密连锁的分子标记。在对26组520条RAPD随机引物筛选中，共有66条引物为DNA多态性引物，选出一个与苜蓿耐盐基因相连锁的分子遗传标记。通过F2代群体的遗传分析，观测到分子标记与耐盐性等位基因之间发生重组，但重组值较小，在A8×D2杂交组合中，重组率为2.27%; 在A5×D1杂交组合中，重组率为4.03%。这些结果表明，这一显性标记与苜蓿的耐盐基因座位连锁程度较为紧密。用国外登记的耐盐苜蓿种质及相对敏盐种质单株对获得的耐盐标记进行验证，85%耐盐种质材料AZ-90NDC-ST的单株DNA都扩增出一个约1 400 bp的DNA片段；75%敏盐种质材料AZ-88NDC的单株DNA未能扩增出此片段。

关键词 苜蓿 耐盐性 分子标记

分类号 S551

Identification and Utilization of Molecular Marker to Salt Tolerance Gene in Alfalfa

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Abstract More than 100 countries exist saline-alkali soil problem with different degree in the world. Alfalfa named “the king of forage” is a very important protein forage, breeding salt tolerant alfalfa cultivars is an economic and effective way for the development and utilization of saline-alkali soil. The objective of this study was to select the molecular markers linked closely to the salt-tolerant genes using the improved BSA (Bulk Segregant Analysis) in F2 population between salt-tolerant and salt-sensitive alfalfa. The molecular marker was used to appraise the germplasm of alfalfa, and realized the assistant selection of parents and cross offsprings in the salt-tolerant breeding and the germplasm innovation of alfalfa. In pot culture, 66 primers that can mark the DNA polymorphism from 520 primers by applying RAPD marker were detected.. Based on the identified results of salt tolerance of cross A8×D2, A5×D1, the salt tolerant and salt susceptible bulks of F2 population, and bulks of their parents were constructed. By using the improved BSA method, a special primer, which could amplify a 1 400 bp fragment in the salt tolerant sample was identified. According to the genetic analysis of the group F2 from A8×D2 and A5×D1 hybridization, there was a small crossing over value between the salt tolerant alleles and its related molecular marker. However the recombination single was rare, only 4 recombination singles appear in F2 offsprings of A8×D2 group, the recombination ratio was 2.27%; only 5 recombination singles appear in F2 offsprings of A5×D1 group, the recombination ratio was 4.03%. These results indicated that the marker were linked closely to the salt-tolerant gene loci of alfalfa through analysis of two cross offsprings and their parents. The molecular markers of salt tolerant gene loci were used to identify external registered alfalfa germplasm resources. A 1 400 bp DNA fragment could be amplified in 85% individuals of AZ-90NDC-ST and 80% ones of Alfanafa which were salt tolerant germplasms, while not in 75% of AZ-88NDC which was a salt sensitive germplasm. Above resuls indicate that molecular marker provides valuble information for selecting salt tolerant parent in improving cultivars and identifing the salt tolerance of different alfalfa germplasm resources.

Key words Alfalfa Salt tolerance Molecular marker

DOI:

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