

植物诱变育种 · 农业生物技术

空间诱变成水稻品种航香糯的SSR标记分析

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摘要:

"航香糯"是经空间诱变育成的籼型香糯稻品种。与原种南丰糯相比,航香糯的产量和稻瘟病抗性有明显提高,粒形变细长,并带有香味。为深入了解空间诱变的机理以及初步鉴定与性状变异相关的区间,本研究用SSR 标记对航香糯与南丰糯进行等位基因变异分析。结果表明,在12条染色体上选取的156个标记位点中检测到45个变异位点,变异频率为28.85%。检测到的变异位点中,42个位点表现为DNA扩增长度的变异,仅1个位点在航香糯中扩增带数增加,另有2个位点在南丰糯中为2条扩增带,而在航香糯中该位点却是扩增带型与诱变亲本小分子量扩增带相同的纯合体(仅1条扩增带),显示诱变后代中部分多态性位点由空间搭载材料杂合态位点的正常基因分离重组产生的。不同染色体上位点变异频率存在较大差异,变异频率最高的染色体是第7、第8和第12染色体,变异频率均达50.00%,变异频率最低的是第6染色体,仅6.25%。变异位点在水稻基因组中随机分布,同时表现成簇分布的特点,显示除点突变外,大片段突变可能也是航天诱变的主要形式。在变异染色体区段有多个已精确定位或克隆的粒型、产量、香味、稻瘟病抗性的QTL座位,这些位点是否与这些性状的变异有关,值得进一步研究。

关键词: 空间诱变 糯稻 SSR分析

SSR ALLELIC VARIATION OF RICE VARIETY HANGXIANGNUO BRED BY SPACE MUTATION

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Abstract:

Hangxiangnuo, an *indica* fragrant glutinous rice mutant, was induced by space environment. Comparing with its wild type Nanfengnuo, the yield and blast resistance of Hangxiangnuo are improved significantly and the grain shape became slender and with fragrance. To understand the mechanisms of space mutation and identify the changes at molecular level associated with phenotypic variations, SSR allelic variation analysis were performed on Hangxiangnuo and Nanfengnuo in this study. The results showed that 45 loci were polymorphic among the 156 SSR loci tested throughout the genome, the frequency of variation was 28.85%. Among the polymorphic loci, 42 loci only showed variations in the molecular weight of the amplified bands, only one locus increased the number of amplification bands in Hangxiangnuo and two loci were differed by heterozygous loci (with two amplification bands at one locus) detected in Nanfengnuo and homozygous loci in Hangxiangnuo. It suggests that the change of some loci in mutants was due to the normal segregation and recombination of heterozygous loci of the wild type. The variation frequencies among different chromosomes were quite different, with the highest one at 50.00% detected on chromosomes 7, 8 and 12, and the lowest at 6.25% on chromosome 6. The polymorphic loci were clustered on chromosomes throughout the genome indicating that large DNA segments mutation is one of the major variation patterns induced by space environment. Some of reported QTLs involved in grain shape, yield, fragrance and blast resistance were found to be located exactly in the mutated regions. Therefore, further study is needed to confirm that these QTLs are responsible for the trait variations.

Keywords: space mutation glutinous rice SSR

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