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研究报告

一个水稻矮秆突变体的遗传分析及基因定位

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Genetic Analysis and Mapping of Rice Dwarf Mutant *ds1*

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摘要 水稻(*Oryza sativa*)是我国重要的粮食作物之一。水稻矮秆材料的引入掀起了第1次“绿色革命”。但近年来, 在水稻育种中矮生基因遗传单一的问题越来越突出, 已经严重影响到水稻产量的持续提高。利用^{60}Co-γ射线辐照籼稻亲本材料M804获得了一个性状能够稳定遗传的矮秆突变体MU101。对该矮秆突变体和台粳16号杂交获得的F_2代的遗传分析表明, 该矮秆性状受1对隐性单基因控制, 并暂命名为*ds1*。利用已有的SSR分子标记将*DS1*基因定位在水稻第5号染色体上, 通过扩大群体和开发新的Indel标记, 进一步将*DS1*基因定位在2个Indel标记之间, 两者间的物理距离大约为384 kb。该研究为*DS1*基因的克隆及其在生产中的应用奠定了基础。

关键词: 矮秆突变体 基因定位 遗传分析 水稻

Abstract: Rice is one of the most important cereal crops. The introduction of dwarf rice has led to the first “green revolution”. However, the genetic uniformity of dwarf gene in rice breeding is a concern, which severely affects the continuous increase in rice harvest. In the present study, we mutated the indica cultivar M804 by using ^{60}Coγ-Ray and obtained a genetically stable rice dwarf mutant (MU101), which was crossed with a japonica cultivar Taigeng 16 to investigate the genetic mode and map the gene. Genetic analysis revealed the phenotype of the dwarf mutant, which we designated tentatively as *ds1*, controlled by a pair of recessive genes. Polymorphic analysis of simple sequence repeat markers demonstrated the *DS1* gene located on chromosome 5. With a larger mapping population and more Indel markers, we further mapped the *DS1* gene between 2 Indel markers with a physical region of about 384 kb. These results provide a basis for molecular cloning and production application of *DS1*.

Keywords: dwarf mutant gene mapping genetic analysis rice

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