

一个新的水稻叶绿素缺失黄叶突变体的特征及基因分子定位

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摘要 从粳稻“嘉花1号”⁶⁰Co γ 射线辐照的后代中筛选到一个叶绿素缺失黄叶突变体(y111), 与野生型“嘉花1号”相比该突变体表现为全生育期植株叶片呈黄色, 叶绿素含量以及净光合速率明显下降, 叶绿体发育不完善, 并且伴随着株高等主要农艺性状的变化。遗传分析表明, 该突变性状受一对隐性核基因(*yl11*)控制。该突变体与籼稻“培矮64S”杂交生产的F₂、F₃群体中的分离出突变体型920个单株作为定位群体, 利用SSR和InDel分子标记将*yl11*基因定位在水稻第11染色体长臂上的MM2199和ID21039分子标记之间, 其物理距离约为110 kb, 目前该区域内没有发现与水稻叶绿素合成/叶绿体发育相关已知功能基因。研究结果为今后对该基因的克隆和功能分析奠定了基础。

关键词: 水稻 叶绿素缺失 黄叶突变体 基因定位

Abstract: A yellow-leaf mutant (y111) with chlorophyll-deficient in rice (*Oryza sativa* L.) was selected from the progeny of a japonica rice variety “Jiahua 1” treated with ⁶⁰Co γ -radiation. In comparison with the wild-type parent, “Jiahua 1”, the mutant had yellow-leaves at whole growth stages and displayed significantly decreased in chlorophyll content and net photosynthetic rate. Underdeveloped chloroplast and alterations of the major agronomic traits, such as plant-heights, were also observed in the mutant. Genetic analysis confirmed that the yellow-leaf mutant trait was controlled by a single recessive nuclear gene (*yl11*). Using SSR and In/Del molecular markers and 920 F₂ and F₃ plants from the cross of y111 with the indica variety Peiai 64S, the *yl11* was mapped between the molecular markers MM2199 and InDel21039 with a physical distance of 110 kb on the long arm of chromosome 11, in which no known functional genes for chlorophyll synthesis or chloroplast development in rice has been found. These findings will provide a foundation for the cloning and functional analysis of this gene in the future.

Keywords: *Oryza sativa* L., chlorophyll-deficient, yellow-leaf mutant, gene mapping

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