

论文

水稻条斑花叶突变体生态 $st(t)$ 的鉴定与遗传定位

桑贤春,徐芳芳,凌英华,赵芳明,杨正林,唐彦强,田晓庆,李云峰,何光华

西南大学水稻研究所 / 农业部西南作物遗传改良与育种重点开放实验室, 重庆 400716

摘要:

利用EMS诱变育成优良籼型恢复系缙恢10号,从其后代中鉴定出一个白色条斑花叶突变体 $st(t)$,在三叶期开始表现白斑,拔节期白斑变为不规则线状,一直保持到成熟。突变体叶绿素含量明显下降,类胡萝卜素含量显著升高。透射电镜观察表明,突变体的绿色叶片部位与野生型相比,在细胞结构上无明显差异,叶绿体发育正常;突变体的白化部位细胞结构异常,质体内多含有积聚在一起的嗜银小球,不能发育出正常叶绿体所具有的类囊体和基质片层结构。遗传分析表明该性状受一对隐性核基因调控,利用1 500株西农1A/ $st(t)$ 的 F_2 隐性定位群体,最终把 $St(t)$ 基因定位在第6染色体SSR标记RM19745和RM19762之间,遗传距离分别为0.07 cM和0.27 cM,根据9311基因组序列推测,两标记之间的物理距离约为345 kb。这为 $St(t)$ 基因的图位克隆和分子标记辅助育种奠定了基础。

关键词: 条斑花叶 水稻 (*Oryza sativa* L.) 叶绿体 基因定位

Identification and Molecular Mapping of Stripe Leaf Mutant $st(t)$ in Rice (*Oryza sativa* L.)

Rice Research Institute of Southwest University / Key Laboratory of Southwest Crop Genetic Improvement and Breeding, Ministry of Agriculture, Chongqing 400716, China

Rice Research Institute of Southwest University / Key Laboratory of Southwest Crop Genetic Improvement and Breeding, Ministry of Agriculture, Chongqing 400716, China

Abstract:

A stripe leaf mutant temporarily designated as $st(t)$ was discovered in the progeny of an excellent *indica* restorer line Jinhui10 seed by treatment of EMS (ethyl methane sulfonate) in Rice Research Institute of Southwest University. The $st(t)$ mutant displayed the variegated leaves at three-leaf stage, the variegation developed the white irregular line stripe from elongating stage to the maturation. Compared with the wild type, the mutant decreased the chlorophyll content and increased the carotenoid content significantly. Cells structure was detected by Transmission Electron Microscopic (TEM), and the results indicated that there was no difference between the wild type and the green parts of the $st(t)$, both of them could develop normal chloroplast; in the white parts of the $st(t)$, cells developed abnormally contained irregular stromal lamellae, aberrant thylakoids and more osmiophilic granules. Genetic analysis suggested that the mutational characters were controlled by one nuclear recessive gene. Xinong1A was crossed with the $st(t)$ and 1 500 mutants from the F_2 population were used for gene mapping. Finally, $St(t)$ gene was mapped between SSR marker RM19745 and RM19762 on the chromosome 6, the genetic distances were 0.07 cM and 0.27 cM respectively and the physical distance was 345 kb according to *indica* rice 9311. This result provides a foundation of map-based cloning of $St(t)$ gene as well as its molecular marker-assisted breeding.

Keywords: Stripe leaf Rice(*Oryza sativa* L.) Chloroplast Gene mapping

收稿日期 2009-07-09 修回日期 2009-10-08 网络版发布日期 2009-12-21

DOI: 10.3724/SP.J.1006.2010.00211

基金项目:

本研究由国家自然科学基金项目(30871495),重庆市杰出青年基金项目(2008AB1033),教育部新世纪优秀

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通讯作者: 何光华, E-mail: hegh@swu.edu.cn

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