

研究论文

分子标记辅助选择小麦抗白粉病基因Pm2、Pm4a、Pm21 的聚合体

高安礼, 何华纲, 陈全战, 张守忠, 陈佩度

南京农业大学作物遗传与种质创新国家重点实验室, 江苏南京210095

收稿日期 2004-10-13 修回日期 2005-2-13 网络版发布日期 接受日期

摘要 利用与小麦抗白粉病基因Pm2、Pm4a和Pm21紧密连锁的PCR标记, 对含有Pm2、Pm4a和Pm21的小麦品系复合杂交后代经3轮分子标记选择, 得到了一批聚合有Pm2+Pm4a+Pm21 3个基因的抗病植株, 以及若干株Pm2+Pm21、Pm4a+Pm21和Pm2+Pm4a 2个基因聚合的植株。同时, 还对中选植株进行抗病性人工接种鉴定。结果表明, 含有Pm21的聚合体与Pm21基因单独存在时抗性相当, 均对白粉病免疫, 聚合体Pm2+Pm4a的抗性好于Pm2或Pm4a单独存在时的抗性。为降低分子标记选择成本, 将检测Pm4a和Pm21的2种PCR放在一个反应体系中进行, 扩增产物经1次电泳, 可同时检测出Pm4a和Pm21, 不同引物之间没有明显交叉扩增现象。

关键词 [小麦白粉病](#) [基因聚合](#) [分子标记选择](#) [表型选择](#)

分类号 [S512](#)

Pyramiding Wheat Powdery Mildew Resistance Genes Pm2, Pm4a and Pm21 by Molecular Marker-assisted Selection

GAO An-Li, HE Hua-Gang, CHEN Quan-Zhan, ZHANG Shou-Zhong, CHEN Pei-Du

National Key Laboratory of Crop Genetics and Germplasm Enhancement, Nanjing Agricultural University, Nanjing 210095, Jiangsu, China

Abstract Pyramiding resistance genes has been supposed as one of the most effective methods for preventing breakdown of major gene conferring resistance to powdery mildew within a short period. It is difficult to select pyramids containing more than two resistance genes by common methods. Marker-assisted selection(MAS) is an ideal technology to select target gene in different genetic backgrounds. Pyramiding resistant genes by MAS has been reported. So far, DNA markers linked to wheat powdery mildew resistance genes had been found. In this study, PCR markers tightly linked or co-segregated with Pm2, Pm4a and Pm21 genes were confirmed to be applicable under different genetic backgrounds, and used to identify Pm2, Pm4a and Pm21 genes in breeding practice. Using these tested markers, a hybrid population with three powdery mildew resistance genes was screened and 100 plants containing Pm2, Pm4a and Pm21 were identified after three-cycle MAS. In addition, dozens of plants with two Pm genes were also obtained. The results of inoculation test indicated that the plants pyramiding Pm21 and other genes showed immunity to powdery mildew, as well as the plants possessing only Pm21. The plants with single Pm2 had lower resistance, while those with Pm4a showed middle resistance to powdery mildew. Notably, the plants with Pm2+Pm4a showed much better resistance than those with single Pm2 or Pm4a. To reduce the cost of MAS, two PCRs were performed in one mixture, in which Pm4a and Pm21 were identified respectively. MAS was compared with phenotypic selection also, from which more comprehensive information was provided.

Key words [Wheat powdery mildew](#) [Gene pyramiding](#); [Marker-assisted selection](#); [Phenotypic selection](#)

DOI:

通讯作者 陈佩度 pdchen@njau.edu.cn

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(469KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中包含“小麦白粉病”的相关文章](#)

▶ 本文作者相关文章

· [高安礼](#)

· [何华纲](#)

· [陈全战](#)

· [张守忠](#)

· [陈佩度](#)