锘

论文

普通小麦品种Brock抗白粉病基因分子标记定位

李根桥，房体麟**，朱婕，高亮亮**，李闪，解超杰，杨作民，孙其信，刘志勇 *

中国农业大学植物遗传育种系/农业生物技术国家重点实验室/农业部作物基因组学与遗传改良重点开放实验室/北京市作物遗传改良重点实验室/教育部作物杂种优势研究与利用重点实验室，北京100193

摘要：

为明确利用Brock转育成的小麦抗白粉病品系3B529(京411*7//农大015/Brock, F_6)抗性的遗传基础，将高感白粉病小麦品系薛早和3B529杂交，获得F_1代、F_2分离群体和$F_{2:3}$家系。抗病性鉴定和遗传分析结果表明，3B529对E09小种的抗性受1对显性基因控制，暂被定名为*MlBrock*。利用BSA和分子标记分析，获得了与*MlBrock*连锁的3个SSR标记*Xcfd81*、*Xcfd78*、*Xgwm159*和2个SCAR标记*SCAR203*和*SCAR112*，根据SSR和SCAR标记在中国春缺体四体、双端体和缺失系的定位结果，将*MlBrock*定位在小麦染色体臂5DS Bin 0~0.63区间上。*MlBrock*与*Xcfd81*和*SCAR203*共分离，与*SCAR112*的遗传距离为0.5 cM。这些分子标记的建立有利于今后Brock抗白粉病基因分子标记辅助选择和基因聚合。综合抗白粉病基因*MlBrock*的染色体定位和抗谱分析结果，推测*MlBrock*很可能是*Pm2*基因。

关键词： 小麦白粉病　Brock　SSR标记　SCAR标记　*Pm2*

Molecular Identification of a Powdery Mildew Resistance Gene from Common Wheat Cultivar Brock

Department of Plant Genetics & Breeding, China Agricultural University / State Key Laboratory for Agrobiotechnology / Key Laboratory of Crop Genomics and Genetic Improvement, Ministry of Agriculture / Beijing Key Laboratory of Crop Genetic Improvement / Key Laboratory of Crop Heterosis Research & Utilization, Ministry of Education, Beijing 100193, China

Department of Plant Genetics & Breeding, China Agricultural University / State Key Laboratory for Agrobiotechnology / Key Laboratory of Crop Genomics and Genetic Improvement, Ministry of Agriculture / Beijing Key Laboratory of Crop Genetic Improvement / Key Laboratory of Crop Heterosis Research & Utilization, Ministry of Education, Beijing 100193, China

Abstract:

Powdery mildew, caused by *Blumeria graminis* f. sp. *tritici* (*Bgt*), is one of the most important diseases of common wheat (*Triticum aestivum* L.) worldwide. Common wheat cultivar Brock introduced from UK is highly resistant (IT: 0;) to powdery mildew prevalent isolate E09 at the seedling and adult plant stages in North China. Genetic analysis using an F_2 segregating population and $F_{2:3}$ lines, derived from a cross between susceptible common wheat lines Xuezao and resistant common wheat line 3B529 (Jing 411*7//Nongda 015/Brock, F_6), indicated that a single dominant gene, temporarily designated *MlBrock*, was responsible for the resistance of 3B529. By bulked segregant and molecular marker analyses, three polymorphic SSR markers (*Xcfd81*, *Xcfd78*, and *Xgwm159*) and two SCAR markers (*SCAR203* and *SCAR112*) were found to belinked to *MlBrock*. Among these markers, *Xcfd81* and *SCAR203* were cosegregated with *MlBrock*, and *SCAR112*, *Xcfd78*, and *Xgwm159* were linked to *MlBrock* with genetic distances of 0.5, 5.5, and 12.7 cM, respectively. According to the available physical bin mapping result of *MlBrock* cosegregated SSR marker *Xcfd81* and *SCAR203* in Chinese Spring, *MlBrock* was further located on chromosome bin 0−0.63 of 5DS. According to the infection-type of E09 *Bgt* isolate and mapping results, *MlBrock* might be powdery mildew resistance gene *Pm2*. The molecular markers developed in this study are useful for marker-assisted selection (MAS) and gene pyramiding of powdery mildew resistance genes in wheat breeding programs.

Keywords: Powdery mildew　Brock　SSR marker　SCAR marker　*Pm2*

通讯作者: 刘志勇, E-mail: zhiyongliu@cau.edu.cn

作者简介:

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