

研究论文

# 小麦赤霉病与DON积累的抗性及其相关SSR位点差异

张凯鸣<sup>1,3</sup>, 马鸿翔<sup>1,\*</sup>, 陆维忠<sup>1</sup>, 蔡志翔<sup>1</sup>, 陈怀谷<sup>2</sup>, 袁生<sup>3</sup>

<sup>1</sup>江苏省农业科学院农业生物技术研究所, 江苏南京210014 <sup>2</sup>江苏省农业科学院植保研究所, 江苏南京210014 <sup>3</sup>南京师范大学生命科技学院, 江苏南京210097

收稿日期 2005-12-30 修回日期 网络版发布日期 2006-11-14 接受日期 2006-5-26

**摘要** 以禾谷镰刀菌(*Fusarium graminearum* Schwabe)菌株进行穗部喷雾和单花滴注接种, 评价了10个小麦抗源的赤霉病和脱氧雪腐镰刀菌烯醇(DON)积累抗性。结果表明, 望水白、苏麦3号、延岗坊主、繁60096属于高抗品种, *Frontana*表现感病, 其余品种表现中抗。除*Frontata*外, 所有抗源DON含量在3 mg/kg以下。不同接种方法间、不同致病菌株间的病小穗率和DON含量以及同一处理内的病小穗率和DON含量间呈极显著相关。利用与已报道的赤霉病抗性QTL相关SSR引物对供试材料进行PCR扩增, 比较扩增产物等位位点的差异, 除4B染色体的GWM113标记外, 其余标记在品种间具有2~8个等位位点, 多态信息含量为0.14~0.85。单倍型分析表明, 延岗坊主具有与望水白一致的3B主效QTL的SSR标记位点, 扬麦158和新中长分别在2D和4B上具有多个与武汉1号一致的抗性QTL相关SSR位点, 翻山小麦在3B和6B上具有多个与苏麦3号或望水白一致的抗性QTL相关SSR位点, 繁60096在2D上有多个与武汉1号一致的QTL相关SSR标记, 而镇麦7459和温州红和尚与已报道的小麦赤霉病抗性多数SSR位点不一致, 可能具有不同的抗性基因。

**关键词** 小麦 赤霉病 脱氧雪腐镰刀菌烯醇(DON) SSR

分类号 S512

## Resistance to *Fusarium* Head Blight and Deoxynivalenol Accumulation and Allele Variation of Related SSR Markers in Wheat

ZHANG Kai-Ming<sup>1,2</sup>, MA Hong-Xiang<sup>1,\*</sup>, LU Wei-Zhong<sup>1</sup>, CAI Zhi-Xiang<sup>1</sup>, CHEN Huai-Gu<sup>2</sup>, YUAN Sheng<sup>3</sup>

<sup>1</sup> Institute of Biotechnology, Jiangsu Academy of Agricultural Sciences, Nanjing 210014, Jiangsu; <sup>2</sup> Institute of Plant Protection, Jiangsu Academy of Agricultural Sciences, Nanjing 210014, Jiangsu; <sup>3</sup> College of Life Science, Nanjing Normal University, Nanjing 210097, Jiangsu, China

**Abstract** *Fusarium* head blight (FHB), caused by *Fusarium graminearum* Schwabe, is an important wheat disease worldwide. Negative effects of the disease include not only reduction of grain yield quality, but also contamination with deoxynivalenol (DON) resulting in potential toxicity to human and livestock. Developing the cultivars with FHB resistance is an effective measure to control the disease. Ten cultivars selected from the breeding program for FHB resistance in China were employed in the study for evaluating the resistance to FHB and DON accumulation by using different isolates and inoculation methods. In comparing with susceptible control Ningmai 6 and Annong 8455, the ten cultivars were classified to three groups with different resistance to FHB, including high resistant group (Wangshuibai, Sumai 3, Nobeokoubozu and Fan 60096), moderate resistant group (Fanshanxiaomai, Wenzhouhongshang, Shinchunaga, Yangmai 158 and Zhen 7459) and susceptible cultivar (*Frontana*). The DON contents of all of them except *Frontana* were lower than 3 mg/kg. There were significant correlations between different isolates and inoculation methods for the scabbed spikelet rate and DON content. The scabbed spikelet rate was also significantly correlated to DON content in the same isolate and inoculation method. The selective cultivars were genotyped with SSR markers linked to FHB resistance QTL on chromosomes 2D, 3B, 4B, 5A and 6B identified previously. The SSR markers except GWM113 from 4B chromosome had *PIC* values of 0.14 to 0.85 and detected 2 to 8 alleles among 13 cultivars. The haplotype showed the same allele of related SSR on chromosome 3B was shared by Nobeokoubozu and Wangshuibai. Yangmai 158 and Shinchunaga had similar SSR alleles to Wuhan 1 on chromosomes 2D and 4B, respectively. Most alleles from Fanshanxiaomai were the same as those from Sumai 3 or Wangshuibai. Most alleles of SSR related to QTL on 2D from Fan 60096 were similar to those from Wuhan 1. However, only one or two alleles in Zhenmai 7459 and Wenzhouhongshang were the same as those of reported SSR markers associated with FHB resistance. The resistances in such cultivars are most likely derived from independent origin instead of Sumai 3, Wangshuibai and Wuhan 1.

**Key words** *Triticum aestivum* L. *Fusarium* head blight Deoxynivalenol (DON) SSR

DOI:

### 扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(637KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [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”的 相关文章](#)

▶ 本文作者相关文章

· [张凯鸣](#)

· [马鸿翔](#)

· [陆维忠](#)

· [蔡志翔](#)

· [陈怀谷](#)

· [袁生](#)

