锘

论文

转 *Rs-AFP2* 基因小麦的分子分析及其纹枯病抗性

路妍[12]，张增艳[1*]，任丽娟[3]，刘宝业[1]，廖勇[14]，徐惠君[1]，杜丽璞[1]，马鸿翔[3]，任正隆[4]，井金学[2*]，辛志勇[1]

1中国农业科学院作物科学研究所/农作物基因资源与基因改良国家重大科学工程，北京100081；2西北农林科技大学植物保护学院，陕西杨凌712100；3江苏农业科学院生物技术研究所，江苏南京210014；4四川农业大学农学院，四川雅安625000

摘要：

Rs-AFP2属于r-硫堇类抗菌肽，主要通过形成离子通道直接破坏细胞来杀灭病原菌。本研究通过基因枪介导法结合对目标基因的分子检测，证明已将外源Rs-AFP2基因转入小麦推广品种扬麦12中。通过逐株抗纹枯病接种鉴定、PCR、PCR-Southern blot、Southern blot和 RT-PCR/荧光定量RT-PCR(Q-RT-PCR)分析，对转*Rs-AFP2*基因小麦T_1至T_4代植株跟踪检测。结果表明，*Rs-AFP2*在转基因小麦中能够稳定遗传，以单拷贝整合到小麦基因组中，遗传方式符合孟德尔遗传规律，并能在转录水平上表达。对转*Rs-AFP2*基因小麦的抗病性、主要农艺性状以及*Rs-AFP2*表达活性分析结果表明，与受体扬麦12相比，*Rs-AFP2*表达活性高的转基因小麦植株对纹枯病抗性有明显提高，其抗病性可以遗传，而主要农艺性状没有明显差异，证明可以利用*Rs-AFP2*基因和基因工程途径创制抗纹枯病小麦新种质。

关键词： 抗菌肽   *Rs-AFP2*   转基因小麦   基因表达   纹枯病抗性

Molecular Analyses on Rs-AFP2 Transgenic Wheat Plants and Their Resistance to *Rhizoctonia cerealis*

1National Key Facility for Crop Gene Resources and Genetic Improvement/Institute of Crop Science, chinese Academy of Agricultural Sciences,Beijing 100081,China;2College of Plant Protection,Northwest A&F University,Yangling 712100,China;3Biotechnology Research Institute,Jiangsu Academy of Aaricultural Sciences,Nanjing 210014,China;4College of Agronomy,Sichuan Agricultural University,Ya'an 625000,China

1National Key Facility for Crop Gene Resources and Genetic Improvement/Institute of Crop Science, chinese Academy of Agricultural Sciences,Beijing 100081,China;2College of Plant Protection,Northwest A&F University,Yangling 712100,China;3Biotechnology Research Institute,Jiangsu Academy of Aaricultural Sciences,Nanjing 210014,China;4College of Agronomy,Sichuan Agricultural University,Ya'an 625000,China

Abstract:

In this study, the gene encoding Rs-AFP2, a small cyteine-rich antifungal protein from radish, was evidenced to be transformed into a wheat (*Triticum aestivum* L.) cultivar Yangmai 12 via bombardment of biolistic particle and PCR detection. To evaluate if expression of Rs-AFP2 enhances the transgenic wheat resistance to *Rhizoctonia cerealis,* a major pathogen of wheat sharp eyespot, the transgenic wheat plants from T_1 to T_4 generations were subjected to *R. cerealis* inoculation and the disease resistance rating, and PCR, PCR-Southern, Southern blotting, and RT-PCR/Q-RT-PCR analyses for the *Rs-AFP2* transgene. Results showed that *Rs-AFP2* gene was integrated as a single copy into the susceptible receptor wheat cultivar Yangmai 12, inherited from T_1 to T_4, and expressed in the wheat background. The transgenic wheat plants expressing *Rs-AFP2* showed enhanced resistance to *R. cerealis* and unchanged agronomic traits compared with nontransgenic Yangmai 12. In the transgenic wheat plants, the express level of *Rs-AFP2* was associated with the disease resistance degree. These results suggested that *Rs-AFP2* gene can be useful for improving wheat resistance to *R. cerealis.*

作者简介:

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