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研究报告

小麦抗白粉病相关基因的转化

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摘要 利用玉米花青素苷合成调节基因*C1-Lc*作为报告基因，通过瞬间表达后愈伤组织表面红色斑点的统计分析，优化了小麦幼胚愈伤组织的基因枪转化参数。小麦*Beclin1*类似基因*TaTBL*和硫代硫酸硫转移酶基因*TaTST*是2个在白粉菌诱导条件下具有增强表达特性的抗病相关基因。本实验进一步利用基因枪将*ubi*强启动子控制下的2个基因导入到小麦品种扬麦158的幼胚愈伤组织细胞中，使用除草剂经两轮选择培养基上的筛选和再生获得抗性植株，进一步通过抗性植株的PCR分析获得转*TaTBL*基因植株5株，转*TaTST*基因植株6株。转基因植株离体叶片的人工接种实验表明，外源基因的导入不同程度上增强了植株的白粉病抗性，表现为延缓了白粉菌的发育。利用玉米花青素苷合成调节基因*C1-Lc*作为报告基因，通过瞬间表达后愈伤组织表面红色斑点的统计分析，优化了小麦幼胚愈伤组织的基因枪转化参数。小麦Beclin1类似基因TaTBL和硫代硫酸硫转移酶基因TaTST是两个在白粉菌诱导条件下具有增强表达特性的抗病相关基因。本实验进一步利用基因枪将ubi强启动子控制下的两个基因导入到小麦品种扬麦158的幼胚愈伤组织细胞中，使用除草剂经两轮选择培养基上的筛选和再生获得抗性植株，进一步通过抗性植株的PCR分析获得转TaTBL基因植株5株，转TaTST基因植株6株。转基因植株离体叶片的人工接种实验表明，外源基因的导入不同程度上增强了植株的白粉病抗性，表现为延缓了白粉菌的发育。

关键词 小麦 白粉病 抗病相关基因 基因转化

分类号

Transformation of powdery mildew resistance-related genes of wheat

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Abstract

<P>Anthocyanin synthesis regulation gene <EM>C1-Lc</EM> was used as the reporter gene to optimize the parameters of gene-gun transformation protocol through counting of red spots on wheat calli after transient expression. Wheat Beclin1 like gene <EM>TaTBL</EM> and thiosulfate sulfutransferase gene <EM>TaTST</EM> proved to have an increased expression level after induction of wheat powdery mildew fungus (<EM>Erysiphe graminis</EM> f.sp. <EM>tritici</EM> Em. Marchal.). These two resistance-related genes were constructed into expression vectors driven by the strong <EM>ubi</EM> promoter and used to perform genetic transformation on wheat cv Yangmai158 immature embryo-derived calli through particle bombardment. After two rounds of herbicide bialaphos selec-tion and regeneration, herbicide-resistance plants were obtained, which were subsequently subjected to PCR analysis. Five <EM>TaTBL</EM> transgenic plants and six <EM>TaTST</EM> transgenic plants were identified. Pathogen inoculation of detached leaves showed that the introduction of exogenous gene increased wheat resistance level by delaying the development of powdery mildew symptoms.</P>

Key words wheat powdery mildew resistance-related gene genetic transformation

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