



1株抗草甘膦棉花突变体草甘膦抗性的初步鉴定

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Preliminary Identification of Glyphosate Resistance of a New Cotton Mutant

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摘要

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摘要 目的在于探明1株新的草甘膦抗性棉花突变体是否可用于发掘新的草甘膦抗性基因以及在农业生产中作为抗草甘膦种质的选育和利用的价值。本文采用PCR的方法,在基因组和转录水平上排除了CP4-EPSPS基因对该突变棉株的污染;通过测定莽草酸含量,鉴定了该突变体草甘膦抗性的典型生理特征;通过盆栽试验研究了该突变体苗期对草甘膦抗性的表型。结果显示:不论草甘膦处理与否,突变棉株莽草酸的含量均有显著的积累,在生理水平上显示出草甘膦抗性植株的显著特点;2叶期时草甘膦处理结果显示,突变棉株的草甘膦抗性表型同孟山都的品种草甘膦的抗性表型基本一致。在基因组和转录水平的PCR检测结果都排除了突变棉株草甘膦抗性的获得是CP4-EPSPS基因污染造成的。结合其他已报道的草甘膦抗性基因的类型排除,说明该抗性突变存在着自身特有的分子机理。

关键词: 棉花 草甘膦抗性 CP4-EPSPS基因

Abstract: The purpose of this paper was to identify the potential value of a novel glyphosate-resistant cotton mutant comprising a new glyphosate resistance gene and to evaluate its agricultural production as glyphosate-resistant germplasm for breeding and utilization. At genomic and transcriptional levels, polymerase chain reaction (PCR) assay was used to exclude possible contamination by the CP4-EPSPS gene in this mutant cotton. The relative content of shikimic acid was determined to evaluate the typical physical characteristics of glyphosate resistance of this mutant. The phenotype of this cotton mutant under glyphosate treatment was observed at the seedling stage in pot cultures. No significant accumulation of shikimic acid was detected with different concentration or without glyphosate treatment in the mutant treated leaves, which indicated the typical physical characteristic of glyphosate resistance. The glyphosate-resistant phenotype of this cotton mutant was consistent with glyphosate-resistant cotton of Monsanto at the two-leave stage during glyphosate treatment. PCR showed that the CP4-EPSPS gene was not present in the genomic DNA, RNA of this mutant; thus, the glyphosate resistance of this mutant was not caused by the CP4-EPSPS gene. The results of similar exclusion tests for other reported glyphosate-resistant genes, indicated a new molecular mechanism existed in this mutant cotton.

Keywords: cotton glyphosate resistance CP4-EPSPS gene

Received 2013-06-25;

Fund:

江苏省博士后科研资助计划(1201031B); 国家自然科学基金(31301682); 江苏省农业科技自主创新基金(CX(12)3068); 江苏省自然科学基金(BK2010465); 国家转基因重大专项(2011ZX08005-001)

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引用本文:

巩元勇, 郭书巧, 束红梅, 何林池, 倪万潮. 1株抗草甘膦棉花突变体草甘膦抗性的初步鉴定[J] 棉花学报, 2014, V26(1): 18-24

GONG Yuan-Yong, GUO Shu-Qiao, SHU Hong-Mei, HE Lin-Chi, NI Wan-Chao. Preliminary Identification of Glyphosate Resistance of a New Cotton Mutant. Cotton Science, 2014, V26(1): 18-24

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