

生物技术 生命科学

几个棉花基因的过量表达对遗传转化的影响

李元宝¹, 罗晓丽², 肖娟丽², 王志安², 司怀军¹, 吴家和³

(1.甘肃农业大学, 甘肃省作物遗传改良与种质创新重点实验室, 兰州 730070|2.山西省农业科学院棉花研究所, 山西 运城 044000|3.中国科学院微生物研究所植物基因组学国家重点实验室, 北京 100101)

摘要:

以棉花品种冀合713和晋棉14为材料, 通过农杆菌介导法将4个棉花内源基因(GhPIP, GhAPX, GhCYP, GhWRKY)过量表达载体分别导入上述两种材料, 均成功诱导出愈伤组织, 并获得再生植株。结果表明转4个基因外植体的愈伤组织诱导、体细胞胚胎分化和植株再生存在着显著或极显著的差异, 但两个品种之间的差异不显著。与转对照载体CK(pCAMBIA 2300)相比, 转录因子GhWRKY的过量表达显著地降低了愈伤组织的诱导、胚胎发生和植株再生; 具有调控功能的蛋白酶基因GhCYP也显著地降低了愈伤组织诱导率; 而两个酶蛋白基因GhPIP和GhAPX的过量表达在各过程中均没有不利影响。PCR鉴定结果表明获得再生植株的转化率没有明显的变化。上述结果揭示结构与功能不同的基因, 在棉花中过量表达会不同程度的影响棉花的遗传转化效率, 其中转录因子和调控蛋白的影响较大, 这也为衡量棉花遗传转化中不同基因的导入所需要的工作量和群体大小提供了一些理论基础和实际应用价值。

关键词: 棉花;不同基因;影响;遗传转化

Effects of Different Cotton Genes&prime|Over-expression on Genetic Transformation

LI Yuan-bao¹, LUO Xiao-li², XIAO Juan-li², WANG Zhi-an², SI Huai-jun¹, WU Jia-he³

(1.Gansu Key Laboratory of Crop Genetic and Germplasm Enhancement, Gansu Agricultural University, Lanzhou 730070|
2.Institute of Cotton Research, Shanxi Academy of Agricultural Sciences, Shanxi Yuncheng 044000|
3.State Key Laboratory of Plant Genomic, Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, China)

Abstract:

Four plant overexpressive vectors containing different cotton genes (GhPIP, GhAPX, GhCYP and GhWRKY) were respectively transformed into 2 cotton cultivars, Jihe 713 and Jinmian 14 mediated by Agrobacterium. Kanamycinresistant callus from 2 varieties were all successfully induced, which then differentiated somatic embryo, and eventually regenerated plants. The results showed that the differences of callus induction, somatic embryo differentiation and plant regeneration were significant among the 4 kinds of vectors containing various cotton genes, but no significant differences were found between the 2 cotton genotypes. Compared with those transformed control vector pCAMBIA2300, the over-expression of transcript factor GhWRKY in cotton tissues significantly reduced the ratio of explants callus induction, calli somatic embryogenesis and plant regeneration. The GhCYP's over-expression also lowered the ratio of callus induction, due to its regulatory function. The over-expression of GhPIP and GhAPX had no adverse effects on the process of callus induction, embryogenesis and plant regeneration. The PCR detection results of regenerated plants showed that there were no obvious differences among the transformation rate. The above results indicated that the over-expression of genes with different structure and function could affect the efficiency of cotton genetic transformation, especially the transcript factor and regulatory protein, and will provide theoretical basis and practical value for measuring the necessary workload and population size in cotton genetic transformation of different genes.

Keywords: Gossypium hirsutum L. different gene effect genetic transformation

收稿日期 2010-10-14 修回日期 2010-11-26 网络版发布日期 2011-02-15

DOI: 10.3969/j.issn.10080864.2011.01.02

基金项目:

国家转基因重大专项(2008ZX08010-004;2009ZX08005-009B);山西省农业科学院支撑项目(YGX0702)资助。

扩展功能

本文信息

- Supporting info
- PDF(566KB)
- [HTML全文]
- 参考文献[PDF]
- 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
- 引用本文
- Email Alert
- 文章反馈
- 浏览反馈信息

本文关键词相关文章

- 棉花;不同基因;影响;遗传转化

本文作者相关文章

PubMed

通讯作者: 吴家和,副研究员,博士,主要从事植物分子生物学与基因工程研究。E-mail:wujiahe@im.ac.cn

作者简介: 李元宝,硕士研究生,主要从事植物分子生物学研究。E-mail:liy312@126.com。

作者Email:

参考文献:

本刊中的类似文章

文章评论

| | | | |
|------|----------------------|------|---------------------------|
| 反馈人 | <input type="text"/> | 邮箱地址 | <input type="text"/> |
| 反馈标题 | <input type="text"/> | 验证码 | <input type="text"/> 0539 |

Copyright by 中国农业科技导报