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论文

转betA/als基因棉花生存竞争力和基因漂流的调查

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摘要:

对导入乙酰乳酸合成酶突变基因als及来自大肠杆菌的胆碱脱氢酶基因betA的棉花纯合株系T3、T4代植株的田间农艺学性状和基因漂流进行了研究。结果表明,与野生型对照鲁棉研19相比,转betA/als基因棉花涉及生存竞争力的一些农艺学性状,如种子繁殖能力、贮存后活力以及盐碱地条件下的经济产量等显著提高,转基因棉花的棉花纤维马克隆值下降,其它农艺学性状无明显差别;获得的转基因性状之一除草剂抗性遗传稳定,并在田间表达良好;在转基因棉花释放区面积为6?m×6?m的条件下,als基因通过花粉介导进入野生型棉花的频率随着非转基因棉花种植区与释放区之间的距离增大而迅速降低,采取适当的隔离距离(大于200?m),可以避免外源基因逃逸事件的发生。但设置隔离区时应考虑昆虫对花粉传播等不确定因素的影响,适当加大隔离距离。

关键词: 转基因棉花; 田间栽培; 除草剂抗性; 基因漂流; 生存竞争力

Investigations on survival competitiveness and gene flow of transgenic cotton with beta/als gene in the field

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Abstract:

T3 and T4 homozygous lines of transgenic cotton, which was transformed with the betA gene coding for choline dehydrogenase from *E. coli* and the als gene coding for acetolactate synthase, were used for the study of biological characteristics and gene flow in the field. The results showed that some agronomic traits concerning with the survival competitive power of the transgenic cotton with betA/als were significantly improved compared with the control of wild type lines Lumianyan19, such as reproductive capacity of seeds, seed vigor after storage and economic yield in saline alkali soil, while the value of micronaire was decreased. The other agronomic traits of the two kinds of cotton were resembled. One of the transgenic character obtained, resistance to herbicide, could be inherited stably and expressed well in the field. In the transgenic cotton release region with the area 6?m×6?m, the frequency of als gene introduced into the wild type cotton was reduced rapidly as the distance from the non transgenic area to the release area increasing. Thus, making proper isolation distance (>200?m) could avoid the occurrence of exogenous gene escape. Yet some uncertain factors such as insects' effect on pollen spread should be considered before setting up the isolation area, and the isolation distance should be increased properly.

Keywords: transgenic cotton; field cultivation; herbicide resistance; gene flow; survival competitiveness

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