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陆地棉主要农艺与纤维品质性状的双列杂交分析

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Report on Diallel Analysis for Main Agronomic and Fiber Quality Traits in Upland Cotton

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摘要 本文利用加性-显性与环境互作的遗传模型（ADE模型），分析8个陆地棉亲本及其F1在不同环境下的农艺和纤维品质性状，在估算遗传方差分量、遗传效应的基础上，分析各类性状间的遗传相关性，并预测F1和F2的杂种优势，为棉花杂种优势利用和新品种选育提供了较有价值的信息。研究表明，农艺与纤维品质性状的遗传主要受加性、显性和加性与环境互作效应控制。遗传相关分析表明，皮棉产量与纤维品质性状的显性相关系数值较大，利用杂种优势在早期世代可以得到协同改良，纤维品质性状间易实现协同改良。杂种优势分析表明，F_1和F_2的皮棉产量均具有显著的超亲优势，纤维品质性状的杂种优势不明显。

关键词： 陆地棉 遗传效应 遗传相关 杂种优势

Abstract： Upland cotton hybrids developed rapidly in China, especially in the Yangtze River and Yellow River valleys. The objective of this research was to provide more valuable information for upland cotton heterosis utilization and new variety breeding, through genetic analysis of new materials selected in recent years. Eight upland cotton parents and their F_1 hybrids were analyzed for their main agronomic and fiber traits in different ecological environments, via the genetic model of additive-dominance with environmental interaction effects(ADE model). Based on analyzing genetic variance components and genetic effects, genetic correlations among all traits were calculated, and F_1 and F_2 heterosis *were* predicted. The results indicated that agronomic and fiber traits were mainly controlled by additive, dominance and additive × environment effects. Genetic correlation analysis showed that the dominant correlation coefficients of lint yield and fiber traits were great, so simultaneous improvement between the two can be easily obtained in early generations under application of heterosis. Moreover, it was easy to achieve simultaneous improvement of fiber traits. Heterosis analysis showed that Hpb (population heterosis over better parent) of lint yield in F_1 and F_2 were significant, and no obvious heterosis was detected in fiber traits.

Keywords： upland cotton genetic effects genetic correlation heterosis

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