



陆地棉配合力与杂种优势、遗传距离的相关性分析

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Correlation among Combining Ability, Heterosis and Genetic Distance in Upland Cotton

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摘要

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摘要 用10个陆地棉亲本进行不完全双列杂交, 共配置了45个组合, 计算亲本的一般配合力(GCA)、特殊配合力(SCA)、杂种优势, 并结合SSR标记研究了陆地棉亲本配合力与杂种优势、遗传距离之间的相关关系。配合力分析发现, 10个亲本的一般配合力和特殊配合力存在显著或极显著差异。分析亲本配合力、杂种优势和遗传距离的相关性发现, 子棉产量、皮棉产量、衣分的一般配合力和杂种优势均呈显著或极显著相关, 纤维长度、比强度、麦克隆值、株高、果枝数、单株铃数、铃重、子棉产量、皮棉产量、衣分的特殊配合力和杂种优势均呈极显著正相关, 而与遗传距离相关均不显著。单株铃数、铃重、子棉产量、皮棉产量、衣分的杂种优势与遗传距离均为正向显著或极显著相关。在育种实践中这些显著或极显著相关的性状可能具有较高的改良潜力。

关键词: 棉花 一般配合力 特殊配合力 遗传距离 杂种优势

Abstract: The general and specific combining ability of ten upland cotton strains for ten traits was assessed in 45 hybrids using an incomplete diallel analysis. The genetic distance between the ten upland cotton strains was estimated using molecular marker data. All ten parents contributed both additive and non-additive genetic effects to their offspring. The analyses of combining ability of the parents indicated that the ten parents showed significant general combining ability (GCA) and specific combining ability(SCA). Furthermore, correlation analyses showed that the GCAs of seed cotton yield, lint yield and lint percentage were significantly correlated with heterosis, as well as that between the SCAs of the fiber length, fiber strength, micronaire, plant height, number of fruit branch, boll number per plant, single boll weight, seed cotton yield, lint yield and lint percent characters and heterosis, while the correlations between SCAs of 10 characters and genetic distance (GD) were not. Heterosis of boll number per plant, single boll weight, seed cotton yield, lint yield and lint percent were significantly or highly significantly correlated with genetic distance. Therefore, all of the significant or highly significant traits could have a high potential for improvement in cotton breeding programs.

Keywords: cotton general combining ability specific combining ability genetic distance heterosis

Received 2011-09-06;

Fund:

863强优势棉花杂交种的创制与应用(2009AA101104)

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引用本文:

杨代刚, 马雄风, 周晓箭, 张先亮, 白凤虎, 王海风, 孟清芹, 裴小雨, 喻树迅. 陆地棉配合力与杂种优势、遗传距离的相关性分析[J] 棉花学报, 2012, V24(3): 191-198

YANG Dai-Gang, MA Xiong-Feng, ZHOU Xiao-Jian, ZHANG Xian-Liang, BAI Feng-Hu, WANG Hai-Feng, MENG Qing-Qin, PEI Xiao-Yu, YU Shu-Xun. Correlation among Combining Ability, Heterosis and Genetic Distance in Upland Cotton[J] Cotton Science, 2012, V24(3): 191-198

链接本文:

http://journal.cricaas.com.cn:8082/mhxb/CN/1002-7807 (2012) 03-0191-08 或 http://journal.cricaas.com.cn:8082/mhxb/CN/Y2012/V24/I3/191

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