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## 棕色棉与白色棉杂交 $F_1$ 代吐絮期光合特性的杂种优势研究

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## Heterosis Studies on Photosynthetic Characters of Brown Cotton, White Cotton and Their Reciprocal Cross $F_1$ in Boll Opening Stage

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摘要

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**摘要** 选择4个棕色棉品种(系)与5个白色棉品种进行不完全双列杂交, 得正反交组合各20个, 测定了吐絮期正反交组合的净光合速率、胞间 $CO_2$ 浓度、叶绿素含量, 叶绿素a/b、PSII的最大光化学效率, 分析杂交 $F_1$ 代光合参数的杂种优势表现与正反交之间的差异。结果表明: 吐絮期杂种 $F_1$ 各项光合参数没有明显的正向中亲优势、正向超亲优势。正反交组合之间, 除胞间 $CO_2$ 浓度存在显著差异外, 其它光合参数差异不显著, 胞间 $CO_2$ 浓度受到细胞质效应影响。正交组合 $F_1$ 叶绿素含量与胞间 $CO_2$ 浓度存在显著正相关, 反交组合 $F_1$ 净光合速率与胞间 $CO_2$ 浓度存在极显著正相关。

**关键词:** 棕色棉 白色棉 光合特性 正反交组合

**Abstract:** Four cultivars (lines) of brown cotton and five cultivars of white cotton were selected as parents, and 20 obverse crosses and 20 inverse crosses were obtained with the design of incomplete diallel cross. The photosynthetic parameters, including net photosynthetic rate, intercellular  $CO_2$  concentration, chlorophyll content and so on, were determined to analyze photosynthetic characters of the parents and their reciprocal crosses in boll opening stage. The heterosis produced by the reciprocal cross  $F_1$  was investigated and the correlation coefficients were estimated among the photosynthetic parameters. The results showed that there were no obvious positive effects on the mid-parent heterosis and the heterosis over the better parent of  $F_1$  in the photosynthetic parameters. As to the cytoplasm effect, except for intercellular  $CO_2$  concentration, there was no significant difference in other parameters between obverse cross and inverse cross, which suggested that intercellular  $CO_2$  concentration was affected by cytoplasm. Moreover, intercellular  $CO_2$  concentration was significantly positive correlation with chlorophyll content in the obverse cross, and with photosynthetic rate in the inverse cross, respectively.

**Keywords:** brown cotton white cotton photosynthetic characters reciprocal cross

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