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## 论文

### 杂交棉标杂A<sub>1</sub>和石杂2号超高产冠层特性及其与群体光合生产的关系

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摘要:

在田间自然条件下, 以标杂A<sub>1</sub>、石杂2号为材料, 研究了超高产(3 500 kg hm<sup>-2</sup>以上)杂交棉冠层的叶面积配置、叶倾角和光分布等冠层特性的变化及与群体光合生产的关系。结果表明, 超高产条件下杂交棉叶面积指数高且持续期长, 群体叶面积配置与光分布较均匀, 花铃期冠层中部有较好的透光性, 吐絮期底部漏光损失较小, 整个冠层仍保持较高的光吸收率。超高产杂交棉不仅群体光合速率峰值高, 而且高值持续时间长, 生育后期非叶器官仍维持较高的光合能力, 特别是茎的光合贡献率为常规高产棉花的1.6~4.9倍, 这是杂交棉在生育后期能保证群体光合优势的一个重要原因。超高产杂交棉的棉铃干物质空间分布与叶分布、光分布和冠层光合分布的比例吻合程度较高, 保证了光能的有效利用, 促进同化物及时向棉铃转运, 有利于挖掘杂交棉品种的增产潜力。

关键词: 冠层特性 光分布 群体光合 杂交棉 超高产

### Canopy Characteristics and Its Correlation with Photosynthesis of Super High-Yielding Hybrid Cotton Biaoza A<sub>1</sub> and Shiza 2

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Abstract:

Alterations of canopy architecture improving photosynthesis may be a way to increase the yield of cotton. Study on the relationship between canopy characteristics and photosynthesis is of great significance to excavate yield potential and construct super high-yielding cultivation technique system. The present investigation was undertaken in the field experiment to evaluate the canopy characteristics, such as leaf area distribution, leaf angle and light distribution, and its correlation with canopy photosynthesis of super high-yielding hybrid cotton (lint 3 500 kg ha<sup>-1</sup>). Two super high-yielding hybrid cotton cultivars, Biaoza A<sub>1</sub> and Shiza 2, were grown with Under-Mulch-Drip irrigation. The results revealed that super high-yielding hybrid cotton had higher leaf area index with longer duration during growth stages. Higher light absorption was observed with better light transmittance in the mid layer of canopy and less light leakage in the lower layer of canopy in super high-yielding hybrid cotton. Higher canopy photosynthetic rate with longer duration was also observed during growth stages. Furthermore, in the late growth stage, non-foliar organs, especially the stem of super high-yielding hybrid cotton remained higher photosynthetic capacity. The photosynthetic contribution rate of stem was 1.6-4.9 times that of the high-yielding traditional cotton, which is an important reason for hybrid cotton to remain superiority of canopy photosynthesis in the late growth stage. In the effective utilization of light energy and promotion of assimilations transport to boll promptly, super high-yielding hybrid cotton has higher anastomosis degrees among leaf, boll and light distributions in each layer of canopy, which is beneficial to enhancing hybrid cotton yield potential.

Keywords: Canopy characteristics Light distribution Canopy apparent photosynthesis Hybrid cotton Super high-yielding

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