



### 种植密度与留叶枝对棉花产量和早熟性的互作效应

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### Interaction of Plant Density with Retention of Vegetative Branches on Yield and Earliness of Cotton (*Gossypium hirsutum* L.)

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摘要

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**摘要** 为实现合理密植与叶枝利用的有机结合, 研究了种植密度与整枝对棉花产量和早熟性的影响。结果表明, 密度和整枝对棉花产量有显著的互作效应。去叶枝情况下, 以低密度 (3.00株·m<sup>-2</sup>) 的产量最低, 中高密度 (5.25~7.50株·m<sup>-2</sup>) 的产量较高; 留叶枝条件下, 以中低密度 (3.00~5.25株·m<sup>-2</sup>) 的产量较高, 高密度 (7.50~9.75株·m<sup>-2</sup>) 的产量较低。去叶枝条件下, 中密度 (5.25株·m<sup>-2</sup>) 比低密度皮棉增产9.7%, 而留叶枝条件下, 低密度与中密度的产量相当, 比高密度 (9.75株·m<sup>-2</sup>) 增产15.3%。密度与留叶枝可以单独或协同影响生物产量、经济系数和产量结构, 对皮棉产量有显著的互作效应。低密度条件下保留叶枝似可弥补密度不足引起的产量损失, 而中、高密度条件下, 去叶枝仍有益处。

**关键词:** 棉花 种植密度 叶枝 互作效应 产量 早熟性

**Abstract:** Optimum plant density and retention of vegetative branches (VB) have been widely studied as a single practice in cotton production, but their combination to approach better yields and benefits was less studied. Since effective combination of plant density and VB retention may further reduce cost and increase yield, it is very important to conduct profound studies on interaction of plant density and VB retention. Using upland cotton Lumianyan 28, a multi-site field experiment was conducted in Linqing City, Xiajin County and Huimin County of Shandong Province respectively, to study interaction of plant density and VB retention on yield, yield components, earliness, and economic index in 2008. A split-plot design with four replications was used for the study. The main plot was plant pruning (removal and retention of VB), while plant density (3.00, 5.25, 7.50 and 9.75 plants·m<sup>-2</sup>) constituted the subplots. Significant interaction was detected between plant density and plant pruning. Plants without VB produced the lowest and highest cotton yield at 3.00 plant·m<sup>-2</sup> and from 5.25 to 7.50 plants·m<sup>-2</sup> respectively, while those with VB produced the highest and lowest cotton yield from 3.00 to 5.25 plants·m<sup>-2</sup> and from 7.50 to 9.75 plants·m<sup>-2</sup> respectively. Under VB removal cotton yield at 5.25 plants·m<sup>-2</sup> was 9.7% higher than at 3.00 plants·m<sup>-2</sup>, but under VB retention cotton yield at 3.00 plants·m<sup>-2</sup> was similar to that at 5.25 plants·m<sup>-2</sup> and 15.3% higher than that at 9.75 plants·m<sup>-2</sup>. Both plant pruning and plant density significantly affected yield components. Boll weight was higher under VB removal than retention, and the number of boll per m<sup>2</sup> increased as plant density raised. There existed significant interaction among site, plant density and plant pruning. Earliness under VB removal was higher than under VB retention, while earliness at 5.25~7.50 plants·m<sup>-2</sup> was better than at 3.00 and 9.75 plants·m<sup>-2</sup>. No interaction of plant density and plant pruning on ratio of seedcotton to stalk, but VB retention and elevated plant density significantly increased biological yield and decreased ratio of seedcotton to stalk. Plant density and plant pruning affected biological yield, economic index and yield components individually or interactively, thus resulting in a significant interaction on economic yield. VB retention can compensate for yield loss due to lower population under low plant density, while VB removal is still beneficial to yield increase under middle and high plant density in Shandong Province.

**Keywords:** cotton plant density vegetative branch interaction yield earliness

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