



不同沟灌方式水、氮调控对棉花产量及水分利用效率的影响

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Effect of Regulation of Water and Nitrogen on Cotton Yield and Water Use Efficiency under Different Furrow Irrigation Patterns

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摘要

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摘要 设置交替隔沟灌、常规沟灌和固定隔沟灌方式, 施氮量和灌水量采用二次通用旋转组合设计进行试验, 研究水、氮调控对沟灌棉花产量、水分利用效率的影响。结果表明: 棉花产量与施氮量在 $56.2 \sim 95.2 \text{ kg} \cdot \text{hm}^{-2}$ 范围内呈显著正相关, 与灌水量在 $37.52 \sim 160.00 \text{ mm}$ 范围内呈显著正相关。相同水、氮处理下交替隔沟灌与常规沟灌相比棉花产量差异不显著, 常规沟灌棉花产量平均比固定隔沟灌高9.15%; 棉花水分利用率与施N量在 $56.2 \sim 122.8 \text{ kg} \cdot \text{hm}^{-2}$ 范围内呈显著正相关, 与灌水量在 $37.52 \sim 160.00 \text{ mm}$ 范围呈显著负相关。相同水、氮处理下常规沟灌与交替隔沟灌相比水分利用效率差异不显著, 常规沟灌的水分利用效率平均比固定隔沟灌高9.01%。因此, 交替隔沟灌能够有效提高棉花产量和水分利用效率。

关键词: 沟灌方式 水、氮调控 棉花产量 水分利用效率

Abstract: By setting the alternative furrow irrigation, conventional furrow irrigation, and fixed every-other furrow irrigation, the amount of nitrogen and irrigation design using two general rotation experiment conducted to study the regulation effect of water and nitrogen on cotton yield and water use efficiency. The results showed that: cotton yield was significantly positively correlative, with nitrogen applied amount in the range of $56.2 \sim 95.2 \text{ kg} \cdot \text{hm}^{-2}$, and same as cotton yield and water within $37.52 \sim 160.00 \text{ mm}$; Cotton yield was not significant different under the same water and nitrogen treatments between alternative furrow irrigation and conventional furrow irrigation, cotton yield of conventional furrow irrigation was higher on average than the fixed every-other furrow irrigation by 9.15%. Cotton water use efficiency and nitrogen within $56.2 \sim 122.8 \text{ kg} \cdot \text{hm}^{-2}$ was a significant positive correlation, and was significantly negatively correlated with irrigation within $37.52 \sim 160.00 \text{ mm}$. Cotton water use efficiency was no significant difference under the same water and nitrogen treatments between conventional furrow irrigation and alternative furrow irrigation, and conventional furrow irrigation was higher on average than the fixed every-other furrow irrigation in cotton water use efficiency by 9.01%. Therefore, alternative furrow irrigation can increase the cotton yield and water use efficiency.

Keywords: furrow irrigation pattern regulation of water and nitrogen cotton yield water use efficiency

Received 2009-06-02;

Fund:

江西农业大学人才科研基金项目, 国家自然科学基金(50879073)

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