

施氮量对不同开花期棉 (*Gossypium hirsutum* L.) 铃纤维细度和成熟度形成的影响

赵文青, 孟亚利, 陈兵林, 王友华, 朱丽丽, 王飞飞, 周治国*

南京农业大学, 农业部南方作物生理生态重点开放实验室, 江苏南京 210095

Effects of nitrogen rate and flowering date on cotton (*Gossypium hirsutum* L.) fiber fineness and maturity formation

ZHAO Wen qing, MENG Ya li, CHEN Bin lin, WANG You hua, ZHU Li li, WANG Fei fei, ZHOU Zhi guo*

Nanjing Agricultural University/Key Laboratory of Crop Physiology and Ecology in Southern China, Ministry of Agriculture, Nanjing 210095, China

摘要

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摘要 为兼顾试验的重复性和生态区域性, 选用高品质棉 (科棉1号) 和常规棉 (美棉33B) 品种为材料, 于2005年分别在江苏南京 (118°50' E, 32°02' N, 长江流域下游棉区) 和江苏徐州 (117° 11' E, 34° 15' N, 黄河流域黄淮棉区) 设置施氮量 (低氮: N 0 kg/hm²; 适氮: N 240 kg/hm²; 高氮: N 480 kg/hm²) 试验, 研究施氮量对不同开花期棉铃纤维细度、成熟度和马克隆值形成的影响。结果表明: (1) 施氮量显著影响棉纤维细度、成熟度和马克隆值的形成过程, 但三者在不同开花期对氮素水平的响应不同, 施氮量与开花期对棉纤维细度、成熟度和马克隆值的形成存在互作效应。8月10日前开花的棉铃, 铃期 [花后0~50 d (DPA)] 日均温在23.3 °C以上, 纤维细度、马克隆值以N 0 kg/hm²施氮量下最大, 棉纤维马克隆值与纤维细度的相关性较大; 8月25日开花的棉铃 (铃期日均温在20.8~23.3 °C之间), 纤维成熟度、马克隆值以N 240 kg/hm²施氮量下最大; 9月10日开花棉铃 (铃期日均温低于20.8 °C), 纤维细度、成熟度和马克隆值均以N 480 kg/hm²最大, 棉纤维马克隆值与纤维成熟度的相关性增强。(2) 影响不同开花期间纤维细度、成熟度和马克隆值的主要因素是铃期日均温, 最终纤维细度、成熟度和马克隆值在不同施氮量之间的变异与不同开花期 (铃期日均温不同) 间的变异比较, 前者显著小于后者。综上, 因开花期不同而形成的铃期日均温是决定细度、成熟度和马克隆值的最重要因素, 施氮量可通过对叶氮浓度NA影响棉纤维细度、成熟度和马克隆值的形成过程, 增加施氮量可减小上述指标在不同开花期间的差异。

关键词: 棉花 施氮量 开花期 纤维细度 纤维成熟度 纤维马克隆值

Abstract: In order to study the effects of nitrogen application rate and flowering date on the formation of fiber fineness, maturity and micronaire, two field experiments were carried out in Nanjing (118°50' E, 32°02' N) and Xuzhou (117° 11' E, 34° 15' N), standing for the different ecological conditions in the middle lower reaches of Yangtze River Valley and the Yellow River Valley in China. Three N levels were set up as N 0, 240 and 480 kg/ha, standing for low, medium and high nitrogen level respectively, and the two cultivars were selected as Kemian 1 and NuCOTN 33B with different fiber quality indices. The result showed that: (1) Nitrogen application rate significantly influence cotton fiber fineness, maturity and micronaire, but the responses of these three indices to N were different. The highest fiber fineness and micronaire was found in N 0 kg/ha before 10-Aug (daily mean temperature was higher than 23.3 °C), while in 25-Aug (daily mean temperature was between 20.8 and 23.3 °C), it was found highest in the treatment of N 240 kg/ha and in 10-Sep (daily mean temperature was lower than 20.8 °C) under the treatment of N 480 kg/ha. (2) The variation of final cotton fiber fineness, maturity and micronaire under different nitrogen application rates was smaller than that observed at different flowering dates, which indicated that, the key factor influencing these three indices was daily mean temperature during 0–50 days post anthesis (DPA) formed at different flowering dates. Our result was also showed that there is an interaction between nitrogen application rate and flowering date. Increasing application of N could reduce the variation of these indexes formed at flowering dates because nitrogen application rates could significantly affect the process of these three cotton fiber quality indices through influencing cotton boll subtending leaf N concentration (NA).

Keywords: cotton (*Gossypium hirsutum* L.) nitrogen rate flowering date fiber fineness fiber maturity fiber micronaire

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Corresponding Authors: 赵文青 Email: 2008201028@njau.edu.cn

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