ANALYSIS OF COTTON YIELD STABILITY ACROSS POPULATION DENSITIES

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Abstract

Final lint yield in cotton (*Gossypium hirsutum* L.) is relatively stable across a wide range of population densities. This study was conducted to determine (1) what components of final lint yield impart this yield stability across plant populations and (2) how yield distribution is influenced by population density. Studies were conducted in 1997 and 1998 at the Coastal Plain Experiment Station in Tift County Georgia on a Tifton loamy sand (Fine-loamy, kaolinitic, thermic Plinthic Kandiudults). Cotton was planted in each study on 91cm row widths at seeding rates ranging from 3.5 to 25.1 seeds m^{-2}. At harvest, each plot was hand picked and boll numbers and weights were recorded at each monopodial branch and sympodial branch fruiting position. Lower population densities resulted in plants with more mainstem nodes and monopodial branches with increased fruit retention, resulting in greater fruit production per plant. Boll size was inversely related to population density. Mean net assimilation rate from first flower to peak bloom was also inversely related to population density. The mainstem node of peak boll set increased with population density. Fruit production on a ground area basis was greater in the first sympodial position as population density increased while fruit production on a ground area basis in third positions and monopodial branches was greater as population density decreased. Accumulative seedcotton from sympodial branches also increased with population density. Total fruit number and seedcotton yield per area were not influenced by population density in these studies. Yield stability across population densities was achieved through manipulation of boll occurrence and weight.

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