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Green Revolution 2.0: Food+Energy and Environmental Security

[Start](#) | [View At a Glance](#) | [Author Index](#)

69-10 Effects of Irrigation and Plant Density On Cotton within-Boll Yield Components.

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Monday, November 1, 2010

Long Beach Convention Center, Exhibit Hall BC, Lower Level

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Cotton (*Gossypium hirsutum* L.) lint yield is integrated through whole-plant and within-boll yield components. Crop management practices such as irrigation and plant density may impact yield. Thus, yield dynamics due to irrigation and plant density may result from changes in the most basic yield components. This study investigated how within-boll yield components are altered through irrigation and plant densities. Field experiments were conducted at the Agricultural Complex for Advanced Research and Extension Systems in Lamesa, TX in 2006 and 2007. Two contemporary cotton cultivars were arranged in a split-split plot design with irrigation rate as the main plot, cultivar as the subplot, and plant density as the subsubplot. Plants from 3 m of one row were removed from each plot and hand harvested by fruiting position. Then first fruiting position bolls from nodes 9 and 14 had their seeds separated by locule position. Seed number, mass and surface area, and lint mass and fiber number for each seed position were recorded. Individual seed surface area and mass increased as irrigation increased and plant density decreased. Seeds per locule increased with increased irrigation and decreased plant density. Superior within-locule yield components occurred in seed positions between the base and midpoint of the locule. Moreover, fiber number per unit seed surface area was not altered by any treatment, indicating it is probably a heritable yield component. Irrigation rate and plant density effects on cotton yield components occurred at the levels of the plant, within the boll, and even within the locule.

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[<< Previous Abstract](#) | [Next Abstract >>](#)