

VARIETY RESPONSE TO IRRIGATION

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Abstract

Sixteen cotton varieties were evaluated in Arkansas, Mississippi, and Tennessee during 2011 for plant yield and fiber response to irrigation. Each trial was implemented as a split block design with blocks representing irrigation level (no irrigation, or well irrigated). Trials in Arkansas and Mississippi were furrow irrigated when the crop reached a two inch water deficit. In Tennessee the well irrigated plots received one inch of water either from rainfall or irrigation weekly. There were significant effects from location. Arkansas received 15.47 inches of rainfall, Mississippi received 19.86 inches of rainfall and Tennessee received 17.5 inches of rain during the growing season. Timing of rainfall played a significant role in cotton development. While total water received by the crop was similar for Arkansas and Mississippi, a four inch rainfall in Mississippi during late August caused dramatic differences.

Plant growth parameters of total number of nodes and plant height were improved with irrigation. Irrigated plots developed two more nodes and were eight inches taller than the non-irrigated check. In Arkansas the addition of irrigation increase the average yield of 16 varieties by 660 pounds of lint per acre. In Mississippi the added irrigation reduced yields 280 pounds per acre due to excessive growth and fruit loss caused by the four inch rain in late August. Tennessee cotton yields were improved 50 pounds per acres with irrigation. The Tennessee location had more timely rainfall and a better soil moisture profile going into bloom than the other locations, thus irrigation response was not a great.

The fiber quality parameter most affected by irrigation was micronaire. In Arkansas irrigation reduced the trial average micronaire from 5.2 to 4.4 in the most rainfall limited environment. In Mississippi and Tennessee micronaire was unaffected by irrigation. At all locations fiber length was improved by the addition of irrigation. Similar to micronaire, in Arkansas fiber uniformity was improved into loan premium range with irrigation. The same trend continued for fiber strength in Arkansas, the addition of irrigation improved fiber strength from base loan grade into premium range.

In summary, trial location and irrigation impacted cotton variety response. Interaction of cotton variety and irrigation was not evident in these trials. However, the dramatically different environments caused variety responses to differ by location and masked any potential interactions of varieties with irrigation.