

Variable Rate Irrigation on Cotton Yield and Fiber Quality - Summary

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Materials & Methods: Three water rates were Base Rate (BR), BR+20%, and BR-20%. The potential evapotranspiration (PET) was calculated daily, 75% of PET was applied as needed at the BR, and then BR +/- 20% was applied as the additional treatments. Paymaster 2326RR planted each year at 138,000 seed ha⁻¹. Soil samples were analyzed for NO₃-N & P at the beginning and ending of each season. Hand picked yield samples were ginned, weighed, and analyzed for fiber quality.

Results: In 2002 and 2003, lint yield increased as the water applied increased. However, water use efficiency (WUE) was not affected in the same manner. In 2003, WUE increased with increasing water application, but that was not the case in 2002 or 2004. During those years, there were no significant differences at any level of water application. In 2003, fiber strength was only affected by the lowest water rate, which is contrary to normal. Micronaire (MIC), a numeric representation of fiber maturity, was affected by water rate. In 2003, all water rates resulted in MIC values above the premium level, but within tolerance levels. In 2004, increased water application decreased MIC and only the BR - 20% rate produced MIC values within the premium range.

Conclusions: The 2003-04 years combined showed no significant differences in yield. Cotton appears not to be a good candidate for VRI in the Texas High Plains (THP) due to the crops indeterminate growth pattern, the short growing season of the area, the traditional deficit irrigation practices used, and the extremely variable weather patterns.

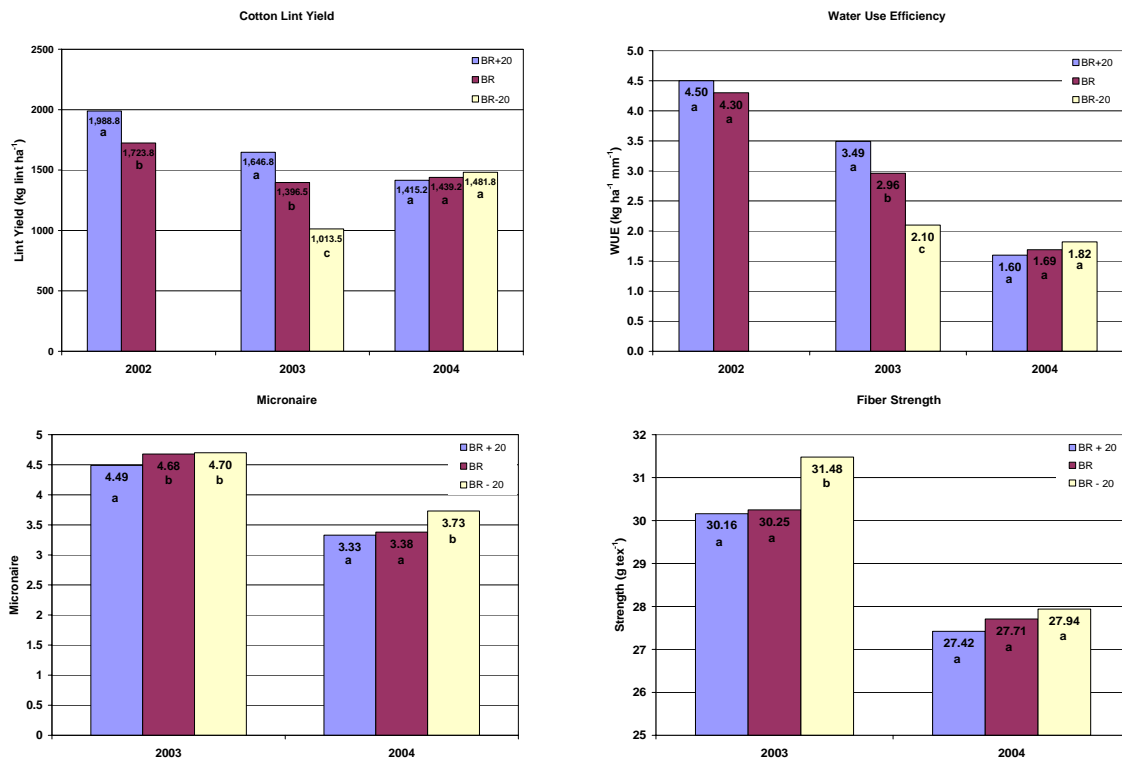


Figure 1. Lint yield, WUE, and fiber data from the site-specific irrigation study conducted from 2002-2004 at the Helms Research Farm.