



**ASA-CSSA-SSSA**  
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## 2009 International Annual Meetings

### *Footprints in the Landscape: Sustainability through Plant and Soil Sciences*

[Start](#)   [Browse by Division of Interest](#)   [Author Index](#)   [Help](#)   [Search](#)

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**Water Use and Yield of Cotton Grown in Four Great Plains Soils.**

*Tuesday, November 3, 2009*  
*Convention Center, Exhibit Hall BC, Second Floor*

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The development of earlier maturing and cool temperature tolerant varieties of cotton (*Gossypium hirsutum* L.) has allowed cotton production to expand northward in the US Great Plains to regions with shorter, cooler growing seasons. The expansion of the drought tolerant cotton into these regions as a substitute for the less drought tolerant maize (*Zea mays* L.) can also help lessen the irrigation water supply burden on the dwindling Ogallala Aquifer. The objective of this research was to evaluate the water use and lint yield of cotton grown in four Great Plains soils under limited to full irrigation. Cotton was grown in 2005 through 2007 in 48 weighing lysimeters which contained either a clay loam, silt loam, sandy loam, or a fine sand (12 each). Climatic conditions were relatively mild in the 2005 and 2007 growing seasons, but the 2006 season began with high temperatures and evaporative demand. Lint yields averaged across the 2005 and 2007 irrigation treatments were significantly larger in the fine sand ( $160 \text{ g m}^{-2}$ ) than in the other soils ( $126 \text{ g m}^{-2}$ ). In 2006, the lint yield in the fine sand was significantly smaller ( $101 \text{ g m}^{-2}$ ) than the average of the other soils ( $147 \text{ g m}^{-2}$ ). The 2006 lint yield in the fine sand did not increase with increasing irrigation application amounts. Warmer soil temperatures early in the season in the drier fine sand in the mild climates of 2005 and 2007 most likely promoted more root development and crop growth which resulted in larger yields compared with the other soils. With the larger evaporative demand in 2006, the low water holding capacity of the fine sand could not maintain growth while both the higher temperatures and water holding capacities in the other soils promoted growth and resulted in larger yields.

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See more of: [Evapotranspiration and Water Use in Agricultural Ecosystems](#)

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