GOSSYM Simulation Analysis of Climate Change Impacts on Cotton Production. (A03-richardson171008-Poster)

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Abstract:

Sensitivity studies were conducted with the GOSSYM cotton model to assess climate change impacts on growth, phenology, and yield at 10 U.S. Cotton Belt locations, using 3 climate scenarios (present; CGCM2- and HadCM2generated future climates). Environmental and management parameters were varied ceteris paribus to isolate their contributions to the composite climate change impact, and to examine climate change-management interactions. Irrigated yield (kg/ha) decreased to the north and east, being higher in arid Southwest and Western Great Plains (2180-2430) than in humid Southeast, Gulf Coast, and North Central regions (1700-2100), due to higher solar radiation and irrigated drought stress mitigation. Plant height and mainstem nodes correlated positively with yield. Rainfed yields generally increased with increases in nitrogen fertilization, CO2, precipitation, irrigation, and solar radiation, and decreased with increases in windspeed, temperature (T), planting date, and optimal T over their tested ranges. Climate change reduced and improved rainfed yield at low and high latitudes, respectively. Knowledge of climate change impacts and application of optimal strategies can alleviate climate-change-associated yield reductions.

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