## COTTON IRRIGATION MANAGEMENT USING LINEAR-MOVE SPRINKLERS IN THE SOUTHWESTERN USA Doug Hunsaker Kelly Thorp Andrew French Kevin Bronson USDA-ARS

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## <u>Abstract</u>

Cotton produced in the arid regions of the Southwestern USA has been predominately irrigated using surface irrigation systems. With the cost of irrigation water increasing, more cotton growers in the region are investing in moving sprinkler irrigation systems. In 2014, the first of two cotton irrigation studies was conducted with a six-span, linear-move sprinkler irrigation (LMSI) system at the Maricopa Agricultural Center in central Arizona. The objective was to evaluate different irrigation scheduling methods with LMSI in the Southwest. The 2014 study was conducted from May through Nov. on a 6.9-ha site. Nozzles along the lateral were spaced every 1.02 m. Cotton was planted on May 1 on 170-m long beds, spaced every 1.02 m. Four irrigation treatments were randomized in plots that were 24 m wide and replicated twice, which begun in late May. Treatments included three irrigation schedules based on crop coefficient (Kc) estimation of crop evapotranspiration (ETc). These were 1) a locally-developed Kc curve denoted as FAO; 2) a Kc derived from remote sensing denoted as NDVI, and 3) a Kc determined from a crop simulation model denoted as CM. The three Kc methods were used to determine irrigation for full ETc replacement based on 45% soil water depletion of the root zone. A fourth treatment (stress) received 70% of the FAO irrigation. Field measurements included irrigation water application, weekly soil water contents, and final lint yield for each plot. Seasonal irrigation amounts were similar for FAO, NDVI, and CM (793-810 mm) compared to 575 mm for the stress treatment. Irrigation scheduling for the CM resulted in lower soil water content than FAO and NDVI during the first 8 weeks after planting. However, the CM treatment received higher rates of irrigation than other treatments through July and August. Final lint yield for the CM averaged 2060 kg/ha and was significantly higher all other treatments. The lowest lint yield was attained with the stress treatment (997 kg/ha). First-year results suggest that cotton irrigation scheduling using the crop model ETc estimation was superior to other Kc methods using the LMSI.