

## **2006 Soybean Report Summary SUPPORT OF LONG-TERM RESEARCH**

C. C. Mitchell, D.P. Delaney, K.S. Balkcom

(Note: These experiments were not supported by the Soybean Committee in 2005 and 2006 but they must be continued because of their value to sustainable agriculture and their role in American agricultural research.)

The Old Rotation (circa 1896) is the oldest, continuous cotton experiment in the world and the third oldest field crop experiment on the same site in the U.S.. Its 13 plots on 1 acre of land on the campus of Auburn University continue to document the long-term effects of crop rotations with and without winter legumes (crimson clover) as a source of nitrogen for cotton, corn, soybean, and wheat. Soybean has been planted as a rotation crop following small grain (e.g. wheat) in the Old Rotation experiment since 1961. Irrigation was installed on half of each plot in 2003. In spite of a severe drought throughout most of Alabama in 2006, crops on the Old Rotation experiment continued a trend that began in 1996 when the experiment changed from conventional tillage to conservation tillage. High wheat and soybean yields, moderate corn grain yields, and another record cotton yield of 1760 lb. lint per acre was produced in 2006. After 4 years of irrigated cotton yields compared to non-irrigated cotton yields on this experiment, we have yet to demonstrate any advantage to irrigating cotton at this location (Table 2). On the other hand, irrigated corn plots produced 125% of the non-irrigated plots and soybean produced 124% of the non-irrigated plots. In 2006, 66 bushels soybean per acre were harvested following 67 bushels wheat per acre.

An historical marker was dedicated at the Cullars Rotation experiment (circa 1911) on 3 November 2006. On the highest fertilized plots (plot 10) in 2006 on the Cullars Rotation, 54 bushels soybean per acre were produced following a 47 bushel per acre wheat crop. An all-time record cotton lint yield of 2050 lb. lint per acre was produced on the treatment that receives complete N-P-K fertilization (plot 3)! This surpasses the previous record cotton yield of 1880 lb. lint per acre on this same plot in 2004. As in the Old Rotation, timely rainfall at this site (Fig. 1) and the long-term benefits of conservation tillage are given credit for high yields in a drought year.

The “Two-Year Rotation Experiment” (circa 1929) (17 fertility treatments replicated 4 times) is located at Tennessee Valley, Sand Mountain, Prattville, Wiregrass, and Brewton. It was planted to cotton and soybean at the Tennessee Valley Research & Extension Center and cotton and peanuts at the Prattville Research Unit (Table 4). Both sites were planted no-till into a small grain residue. Due to the drought, both cotton lint yields and soybean yields were very low at the Tennessee Valley location with soybean yields averaging 19 bushels per acre in 2006. Differences due to fertility treatment were less dramatic in 2006 compared to higher yielding years.