costs. These costs were estimated with the Mississippi State Budget Generator using average prices that occurred in Mississippi during 2004. Gross revenue from the cotton enterprise was based on row pattern treatment gin turnout lint yield averages for 2003-2005 at Verona and Falkner and 2004-2005 for Clarksdale and the net loan price. The loan rate of $0.52 per pound for Mississippi was adjusted for treatment lint fiber quality and then used to compute lint revenue for each treatment. Cottonseed price of $88/ton and seed yield was estimated at 1.55 lb seed/lb of lint for each treatment. Since the seed was treated as a revenue item, a charge for ginning at $0.08/lb of lint and hauling at $0.02/lb of lint were included as operating cost.

The results at all locations indicated 15-inch row solid cotton canopied earlier, was 2 to 6 inches shorter in height than 30 and 38-inch rows but showed no differences in maturity (% open bolls at defoliation). The 15-inch rows had smaller stem diameters with minor differences in rotten bolls compared to 30 or 38-inch rows at all locations. There were no meaningful differences in fiber quality (HVI) between treatments. The 3-year average yield for 15-inch rows at Verona and Falkner were 971 lb/acre and 1260 lb/acre, respectively. The 2-year average yield at Clarksdale was 1195 lb/acre. The 15-inch row yield at Verona, Falkner and Clarksdale were 43, 48 and 11 lb/acre higher than 30-inch rows, respectively; and 103, 123 and 1 lb/acre higher than 38-inch rows, respectively.

The whole farm net revenue analysis (above total specified cost) indicated that at all locations the row patterns with the wider harvest swath allowed more acreage to be farmed with the same machinery, which reduced machinery ownership cost/acre and had greater total whole farm net revenue. In the Hills (Verona and Falkner), compared to 15-inch solid, the 15-inch 2 x 2 skip-row pattern allowed doubling the cotton acreage from 1222 to 2444 acres, reduced machinery ownership cost by $49/acre and increased net returns above total specified cost by $72 to $119/acre; and showed the highest total whole farm net revenue. The 15-inch solid and 30-inch solid showed the lowest total whole farm net revenue.

Compared to the 15-inch solid, the 15-inch 2 x 1 skip-row and 30-inch 2x1 skip row at Clarksdale with harvest swath widths of 22.5 ft increased the cotton farm acreage from 2749 to 4124 acres and net return by $42/acre. The 38-inch solid had highest net return of $205/acre but whole farm net revenue was about $11,000 less than 30-inch 2 x 1 skip and 15–inch 2 x 1 skip-row patterns. The higher net revenue was partially due to the whole farm acreage differences that ranged from 3482 acres for the 38-inch rows to 4124 acres for 15-inch 2x1 skip row. This reduced the machinery ownership cost by $10/acre for 30-inch 2 x 1 skip-row and 15-inch 2 x 1 skip-row patterns.

In summary, the 15-inch 2 x 1 skip-row pattern for the Delta and the 15-inch 2 x 2 skip-row pattern for the Hills allowed more cotton acreage to be farmed with the same compliment of equipment and showed greater whole farm net revenue, even with a 5 and 10% lower yield than 15-inch solid respectively. Although 15-inch solid cotton showed earlier canopy closure and some yield advantage, growers interested in growing 15-inch row cotton should consider the impact the chosen 15-inch row pattern may have on their equipment utilization efficiency, harvesting efficiency, and whole farm net revenue.

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Cotton Lint Yields Following Corn And Cotton In Rotation

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Research was established at the Delta Research and Extension Center (DREC, Bosket very fine sandy loam [Mollic Hapludalf]) and at the Tribbett Satellite Farm (TSF, Forestdale/Dundee silty clay loam [Typic Ochraqualfs/Aeric Ochraqualfs]) beginning in 2000 to investigate the interaction of nitrogen (N) rates and potassium (K) rates in cotton/corn rotation systems. The studies were designed to evaluate rotational effects on poorly drained to somewhat-poorly drained silty clay loam soils (Forestdale/Dundee) and better drained sandy loam soils (Bosket) for optimum cotton and corn production. The studies were setup to examine both the benefits and problems associated with corn/cotton rotations in the Mississippi Delta. Changes in farm legislation in the last decade has allowed mid-south producers the flexibility to shift from continuous mono-crop cotton to alternative crops and cropping sequences to replace some of their traditional cotton acres while using rotation to improve soil productivity. These studies were intended to examine the impact of cotton/corn rotations on the whole farm enterprise. The objectives of the studies included a) determining the effects of N and K nutrition on cotton lint yields and corn grain yields for different soil types, and b) determining rotational effects of corn on cotton production and the implications of these rotations on whole farm economics. Areas were setup on each research farm that could be rotated over a 3-year period with one year planted to corn and the two subsequent years planted to cotton. Each of the three sections at each location had a factorial arrangement of nitrogen (N) and potassium (K) rates. The corn and cotton sections consisted of four-row (40-in spacing) plots, 90 to 100 feet in length, with either four (TSF) or five (DREC) replications. Nitrogen rates were 60, 90, 120, 150, and 180 lb N/acre for cotton and 120, 160, 200, 240, and 280 lb N/acre for corn with the fertilizer N applied as urea-ammonium nitrate solution (32% N). Potassium rates for all rotations were 0, 40, 80, and 120 lb K/acre. Nitrogen was applied at a uniform rate (60 lb N/acre for cotton, 120 lb N/acre for corn) prior to or near planting with the various N rates established as a sidedress application. Potassium applications were made after planting utilizing a 0-0-16 solution (1.3 lb K/gal) applied with the same equipment used for N applications. Corn and cotton cultivars with high yield potential were planted at each location and maintained throughout the growing season. Soil moisture sensors were installed to measure soil water tension and the data used to initiate, schedule, and terminate irrigations for both corn and cotton whenever possible. Crops were harvested by use of commercial harvesters modified for plot harvest with grab-samples taken for laboratory analyses and ginning. Stand counts were taken in the corn studies by counting the stalks in one of the two remaining border rows. The seedcotton grab samples taken at harvest were later ginned through a 10-saw micro-gin for calculation of lint percent. Data were summarized and statistically analyzed using SAS (Statistical Analysis Systems) with mean separations by Waller Duncan K-ratio t-tests and Fisher=s Protected Least Significant Difference (LSD).

Main effects means across N rates and K rates were used to evaluate the benefits from corn in the production systems. Comparisons were made of cotton following cotton and cotton following corn with the latter used to measure the actual benefits from corn in the system. There was no significant interaction between N rates and K rates at either location over the years. Both corn and cotton have shown significant responses to increasing N rates while neither has shown significant increases with increasing K rates. The response to rotation has been variable with differences ranging from an 11.1% decrease to a 50.1% increase in yield with cotton following corn at TSF. Total lint yield has averaged 908 lb/acre/yr where cotton followed cotton and 1015 lb/acre/yr where cotton followed corn. This translates to an 11.8% increase (107 lb/acre/yr) where cotton follows corn in rotation. The DREC location has six years of data with an average of 873 lb/acre/yr where cotton followed cotton and 1013 lb/acre/yr for cotton following corn. Over the six years, the rotational response has ranged from an 8.1% decrease to a 51.7% increase with a mean average of 16.0% (139 lb/acre/yr).

Several factors have affected the rotational benefits with the primary influence coming from climate/weather related phenomena. Specifics included rainfall total and distribution, solar radiation and cloudiness, humidity and air movement, and physical limitations such as drainage or irrigation. During the time of these studies, rainfall in August has set all time records for the least (0.0 in, 2000) and most (8.47 in, 2001) in back-to-back years. The largest rotational responses (percent) has occurred in years with severe droughts where irrigation was not timely or sufficient. In other years, excessive rainfall and the associated cloudy days resulted in photosynthetic stress and subsequent fruit shed. Heavy vegetative growth has also resulted in severe boll rot that was more pronounced in cotton following corn compared to cotton following cotton. The other major area of factors that affect rotational responses deal with production-related problems. These factors have included delayed planting dates as related to harvest windows, weed competition in rotation systems, antagonism between pesticides, and pesticide drift, especially with residual herbicides. In rotations, some residual herbicides cannot be used due to the potential for carryover in following crops. Increased pressure from perennial grasses such as bermudagrass and johnsongrass has resulted in lower yields for cotton following corn as compared to cotton following cotton. Many of the problems have been cleaned up in the second year of cotton following corn. Bio-technology offers some solutions for the problems that have been identified and have been incorporated into the studies. In general, with an average of 12 to 16% increase in yields with rotation, the practice will be continued.