Cropping Systems For Conservation And Profitability

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Many farmers use conservation tillage and year-long cropping practices with winter cover or grain crops to increase surface residue, reduce erosion and help improve surface water quality. Combining year-long cropping practices with no-till is also the most efficient way to build organic matter in southern soils and along with residue from winter crops provides a system with unparalleled benefits for soil and water quality. No-till and crop residue also conserve soil water, which can improve yields of the following summer crops. The year-round system of doublecropping wheat and soybean has been a common practice throughout the Mid-South for 30 years. Acreage in doublecropping varies and is reliant on the perceived profitability and increased risk for the summer crop. Cotton has received increased interest as a doublecrop in recent years because current varieties with embedded traits may be more adapted to this practice. Risks have always been perceived to be greater because cotton is a much higher input crop that depends on early planting dates and long growing season to maximize yield.

BMP cropping systems are being evaluated in the LSU AgCenter for yield and economic benefits as production systems intended for soil and water quality improvement. The studies include evaluation of doublecropping wheat and cotton; and doublecropping wheat with cotton in various rotations with soybean, corn and grain sorghum. Continuous winter fallow/monocropping of each of the summer crops was included for comparison purposes. The commodity yields of the doublecrop systems have been higher than monocrop systems because of the added yield of wheat grain that averaged 63 bu/acre. Cotton usually sustained yield reductions of about 10% in double crop systems. This yield reduction is a significant economic penalty because it represents a loss directly from the net returns. However, it also represents a direct exchange for 63 bu of wheat per acre.

The economic benefit of the cropping systems was determined primarily by the commodity and input prices for a given year. Using enterprise budgets based on the yields and inputs for each system and annual prices, doublecropping was more profitable than monocropping. Across six years, doublecrop cotton/wheat produced annual net returns that ranged from $164.00 to $340.00 per acre from average yields of 63 bu wheat per acre and 1043 lb cotton lint per acre. The system of producing three crops in two years of corn-wheat-cotton, soybean-wheat-cotton, and sorghum-wheat-cotton averaged annual net returns that ranged from $261 to $320.00 per acre. In comparison, monocrop cotton averaged much lower net returns of $112.00 to $167.00 per acre from average yields of 1110 lb lint per acre.

Production risk is an important consideration for doublecrop cotton. Probably the greatest risk factor is the possibility of soil water deficient, especially at planting time. Irrigation capability eliminates this risk by ensuring a stand of cotton and rapid crop development. Other risks are related to the later-maturity of the cotton and include insects and tropical systems that bring extensive rain and high winds. Production risks for dou-

ble crop cotton in the seven years of the current study were found to be no greater than with monocrop cotton because these were irrigated studies. The four tropical storms that did arrive were in late August and early September but only Hurricane Gustav in 2008 caused severe crop damage.

The wheat-cotton doublecrop systems studied in the LSU AgCenter are highly productive and have potential to improve soil and water quality and therefore qualify as BMPs. These studies were conducted with no till, a viable economic practice because of the associated savings in fuel, equipment and labor costs.

Double Cropped Cotton After Wheat Response To N Rates

Presented by Dr. Normie Buehring
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A 2008 study was conducted at the North Mississippi Research and Extension Center to evaluate cotton growth and yield response to N rates in a double cropping system following wheat on a Leeper silty clay loam soil. Mono-crop cotton planted in mid-May (5/20/08) and mono-crop cotton planted in early June (6/05/08) with the 90 lb N/ac were standards for comparison to double-crop cotton planted no-till into 8 to 12-inch wheat stubble on 38-inch beds in early June. Cotton cultivar Phytogen PHY 375 WRF was used with a seeding rate of 58,000 seed/ac. A colter-knife system was used to apply the liquid nitrogen (32%N as UAN) approximately 8 inches from the row and 2 to 3 inches deep. The mono-crop cotton planted mid-May was side-dressed at 90 lb N/ac on 6/16/08. Side-dress N rates of 0, 30, 60 and 90 lb N/ac were applied 6/24/08 to early June planted cotton in wheat stubble. Good agronomic practices were applied to the whole study. The May planted cotton was defoliated 9/25/08 and harvested 10/01/08. The double-crop and mono-crop cotton planted in early June was defoliated with Prep + Folex on 10/22/08 with a repeated application on 10/30/08 and a 11/06/08 harvest date.

The study wheat yield average was 67 bu/ac. Rainfall during the cotton growing season was 10 and 62% of normal for June and July, respectively, and 179 and 133% of normal for August and September, respectively. Observation notes indicated that the May planted mono-crop cotton first flower date was 7/09/08 with a 7/29/08 first flower date for the June planted mono-crop cotton, and an 8/01/08 first flower date for the June cotton planted in wheat stubble. The N rates (30, 60 and 90 lb N/ac) showed no difference in total harvestable bolls/plant and plant height, but all treatments had more harvestable bolls than the 0 lb N/ac check treatment; and were taller at maturity than both May planted mono-crop cotton and the early June planted cotton in wheat stubble 0 lb N/ac check treatment. The stubble height or stubble residue environment increased the first fruiting branch node location. The first fruiting branch node for the mono-crop cotton 5/20/08 and 6/05/08 plantings was node 6 with node 7 for the cotton planted in wheat stubble with all N rates. Wheat stubble had an impact on cotton maturity. The cotton in the wheat stubble percent open bolls at defoliation (10/22/08) ranged from 29 to 37% and was lower than the 58% open for mono-crop cotton with the same planting date.

The lint yield results indicated that mono-crop cotton planted in either mid-May or early June had similar yields with 1223 lb lint/ac for May planted and 1279 lb lint/ac for June planted. These yields were approximately twice the 0 N lb/ac check treatment and approximately 36% higher than cotton planted in wheat stubble with the same N rate and planting date. The 60 lb N/ac treatment had the highest yield response to nitrogen with 896 lb lint/ac but was not different from 30 and 90 lb N/ac. The 0 lb N/ac check had the lowest yield of 638 lb lint/ac. These preliminary results indicated no-till cotton with 60 lb N/ac can be grown successfully following a wheat crop in a non-irrigated environment. The 60 lb N/ac is adequate nitrogen for double-crop cotton following wheat. The first fruiting branch node was one node higher for cotton planted in wheat stubble than mono-