

**THE EFFECT OF BANDING VS. BROADCAST  
N-P-K FERTILIZER AT PLANTING ON  
YIELD OF COASTAL PLAINS COTTON**

**Duren Bell and Glenn Harris**

**University of Georgia  
Eastman and Tifton, GA**

**Gibbs Wilson**

**Sure-Grow Seed, Inc.**

**Eastman, GA**

**Abstract**

Because of the increased interest in strip-till cotton production, many questions have risen about banded vs. broadcast methods of fertilization. Does banding produce an improvement in yield? Does any improvement in yield off set the additional time and labor necessary for banded application? Can fertilizer rates be reduced because of banded fertilization? What rate should be used for banded application?

This study was designed to determine whether yield was effected by the placement of the fertilizer and whether yield was effected by a reduced rate when the fertilizer was banded as compared to a full rate that was broadcast. The field study was conducted in 1996 and 1997 on McCranie Farms in Eastman, GA with the assistance of farm operator Dean McCranie. Cotton plots were established on a Tifton loamy sand following cotton. In 1996, three treatments were used on both irrigated and non-irrigated land. The treatments were: 1) full rate broadcast. 2) full rate banded, and 3) 2/3 rate banded. In 1997, only irrigated plots were studied. The same treatments were used with the addition of a fourth treatment 4) 2/3 rate broadcast. The full rate of fertilizer in this study was 230 lb./a of 8-16-24 and the 2/3 rate was 170 lb./a of 8-16-24. (In 1997, 150 lb./a of 0-46-0 was applied to the plot area before planting.) There were no significant differences in yield based on fertilizer placement or rate.

**Introduction**

Dodge County, Georgia is located in the upper one third of the coastal plain of the state. Much of the land in the area is slightly rolling and requires some method of conservation tillage. Most of the fields are terraced, but many farmers are beginning to consider strip-till farming as an alternative method of meeting conservation tillage requirements. The farmers feel that there may be some advantage to placing the nutrients nearer the root system to allow for better uptake that will result in higher yields. In addition, there is the idea that better uptake may translate into reduced rates therefore a cost savings. Research was needed to answer these questions.

Dodge County produces between 19,000 - 20,000 acres of upland cotton per year. Most of the cotton has been produced by conventional tillage methods. In addition, a small acreage has been produced using the band method of fertilizer distribution.

**Objectives**

The objectives of this study were: 1) To compare the effect of banding vs. broadcast fertilization methods on yield, and 2) To determine if N-P-K rates can be reduced when the nutrients are band applied as compared to broadcast application.

**Methods and Materials**

This study was conducted on McCranie Farms in Eastman, GA in cooperation with Dean McCranie, co-owner and operator, in 1996 and 1997. In both years, the plots were planted on a Tifton loamy sand. The experimental design was a randomized complete block and replicated four times. The cotton variety was DPL 33B. The broadcast treatments were applied using a Vicon fertilizer spreader. The banded treatments were applied on a 2 inch deep by 2 inch to the side placement using a KMC planter. The cotton was planted in early April and harvested in late October. Herbicide and insecticide applications were made based in recommended guidelines. The plots were mechanically harvested and representative seed cotton samples were ginned to determine lint yields. Analysis of variance and multiple range test for separation of means was conducted to determine significant effects of application method and rates on cotton lint yield.

In 1996, both irrigated and non-irrigated test were done. At both sights, the plots were approximately 12 feet wide (4 rows) by 800 feet long. Each sight had three treatments applied at planting: 1) 230 lb./a IMC 8-16-24 broadcast, 2)230 lb./a IMC 8-16-24 banded, and 3) 170 lb./a IMC 8-16-24 banded. An additional 250 lb./a of 15-0-14 was applied as a sidedress at first square on all of the plots. The irrigated field received an additional 40 lb./a of 25-0-0-5S through the irrigation system at first bloom.

In 1997, the test was done under irrigation only. The plots were approximately 12 feet wide (4 rows) by 890 feet long. The 1997 test included the same treatments as 1996, 1) 230 lb./a IMC 8-16-24 broadcast, 2)230 lb./a IMC 8-16-24 banded, and 3) 170 lb./a IMC 8-16-24 banded, plus 4) 170 lb./a IMC 8-16-24 broadcast. An additional 150 lb./a 0-46-0 was broadcast prior to planting over the entire plot area. The cotton was side dressed with 300 lb./a of 20-0-20 at first bloom.

**Results and Discussion**

In 1996, no significant yield difference was observed between any of the treatments (Table 1). There was no

significant difference in yield between the full broadcast rate or the full banded rate. This indicates that the method of fertilization does not have a significant effect on yield. In addition, the rate apparently had no effect on yield as well. It would be easy to conclude that reducing the rate of fertilizer in the band was a sound agronomic practice in this case, however, there was no comparison to a reduced broadcast rate. Therefore, the study was modified in 1997 to determine if the banding of the reduced rate was the factor that maintained the yield or if other factors contributed.

In 1997, there was no significant difference in yield regardless of method of application or rate (Table 2). The 1997 data confirmed what had been observed in 1996 as it related to the placement of the fertilizer. No difference in yield was observed in the banded plots when compared to the broadcast plots in 1997. This data further indicated that there was no yield advantage to banding the fertilizer over broadcast application. The 1997 study further revealed that there was no difference in yield in the plots treated with the reduced broadcast rate when compared to the banded reduced rate. Because the two application methods at the reduce rate were equal in yield, it could be determined that reducing the rate of the banded fertilizer was not the contributing factor to maintaining yield. It should be noted, however, that the reduced rate plots trended toward a higher yield than the full rate plots though the difference was not significant. It should also be noted that the reduced fertilizer rate was still equal to or above the recommended rate according to the soil test results. This yield increase may be the result of less vegetative growth in the reduced rate plots that translated into slightly higher reproductive growth.

### Conclusions

The placement and rate of fertilizer at planting have no significant effect on yield in coastal plain cotton. Broadcast fertilization cropping systems offer equivalent yield to systems that utilize banded at planting methods of fertilization. Whether using the full or reduced rate of fertilizer, placement of the fertilizer was irrelevant.

Fertilizer rate showed no significant effect on yield, however, there was a trend toward higher yields where rates were reduced. This trend could be the result of excessive

growth due to fertilizer rates that exceeded the recommended levels. It should be noted that the fertilizer rate used by the cooperators could be reduced without effecting yield. The phosphorus levels found in the soil test were low and the rates used were an effort to build soil test levels. The data for this variable was inconclusive and further study is recommended.

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Table 1. Effects of method of N-P-K placement and rate on cotton yields in 1996.

Placement*	Rate**	Irrigated			
		Seed Cotton (lb.)	% Lint	Lint Yld. (lb.)	Seed Yld. (lb.)
BC	Full	3178	40.6	<b>1290</b>	1888
BD	Full	3230	40.3	<b>1303</b>	1927
BD	2/3	3198	39.5	<b>1263</b>	1935
Significance***		NS	.1551	NS	NS
CV%		3.7	1.8	4.1	3.9
Non-irrigated					
BC	Full	2180	35.8	<b>779</b>	1401
BD	Full	2198	35.8	<b>788</b>	1410
BD	2/3	2152	36.0	<b>774</b>	1378
Significance***		NS	NS	NS	NS
CV%		4.6	1.7	4.1	5.0

Table 2. Effects of method of N-P-K placement and rate on cotton yields in 1997.

Placement*	Rate**	Seed Cotton			
		(lb.)	% Lint	Lint Yld. (lb.)	Seed Yld. (lb.)
BC	Full	2494	39.6	<b>986</b>	1507
BC	2/3	2572	39.5	<b>1011</b>	1560
BD	Full	2439	39.9	<b>972</b>	1467
BD	2/3	2572	39.6	<b>1019</b>	1553
Placement					
Significance***		NS	NS	NS	NS
Rate					
Significance***		.0694	NS	.1037	.0696
CV%		4.08	1.6	4.01	4.44

\* Placement - BC-Broadcast, BD-Banded

\*\* Rate - Full=230# 8-16-24, 2/3=170#8-16-24

\*\*\* Significance at the .05 probability level