by Drs. C. W. Bednarz and G. J. Gascho

Cotton Starters Showing Potential In Coastal Plain

Georgia scientists study effects of using fluid starters in combination with broiler litter often used on southeastern croplands.

Summary: *Starter fertilizer can be a valuable management tool for the progressive farmer. Starters may alleviate nutrient imbalances when broiler litter is used as a nutrient source. Starters also provide early-season nutrient enhancement, which may lessen the negative effects of adverse growing conditions. Finally, starters may be used to more evenly distribute nitrogen throughout the growing season on Coastal Plain soils. The economics of today's cotton production requires that farmers produce high yields with lowest possible costs per unit of production. Growers may find starter fertilizers useful in achieving these goals.*

Native Americans were probably the first to practice precision fertilizer placement when they buried fish below the seed hill at planting. Since that time volumes of literature describing the effects of starter fertilizers in crop production have been published. Starter fertilizers in cotton, however, are relatively new. Until now, cotton starters have not been investigated in the Coastal Plain of Georgia.

Two studies

The first study was conducted at the Coastal Plain Experiment Station in Tifton, on a Tifton loamy sand. Cotton was planted into wheat stubble in which 0, 2, 4, or 6 tons/A of broiler litter had been surface applied. The large broiler industry in Georgia is looking to the Coastal Plain cropland for litter disposal. However, poultry litter does not contain balanced nutrition for the crop. Thus, starter fertilizers may be of value in providing balanced nutrition for these production systems.

The second in a series of studies was conducted at our experimental sites at Tifton, Midville, and Plains. Soil at Midville is a Dothan loamy sand, and at Plains a Greenville sandy clay loam. The standard fertility practices at each location were:

Tifton: 600 lbs/A of 3-9-18 preplant incorporated (PPI) and 60 lbs/A sidedress N

Midville: 372 lbs/A of 8-8-16 PPI and 30 lbs/A sidedress N

Plains: 300 lbs/A of 3-9-18 PPI and 60 lbs/A sidedress N

Starter source

Starters applied in the first study were 10-34-0 and 8-22-5-2S at 10 gal/A two inches to the side and two inches below the seed drill. In addition, the starter plots were split. Either no foliar applications were made or 10 lbs/A of potassium nitrate (KNO_3) was applied to the foliage at bloom, two weeks later, and four weeks later.

Starter fertilizer treatments used at all sites in the second study were:

- 9-0-0-11 ($CaNO_3$) at 9 gal/A
- 28-0-0-5S at 10 gal/A
- 10-34-0 at 10 gal/A
- 32-0-0 at 10 gal/A
- 10-34-0 at 9.1 gal/A plus 32-0-0 at 6.8 gal/A (to give 34 lbs N and P_2O_5/A)
- untreated (all starters were applied 2 by 2 below seed row).

Starter fertilizers were used in these studies as a means to more efficiently distribute nitrogen (N) throughout the growing season. All treatments within a location received the same amount of N. Therefore, if additional N was applied at planting with starters, less was applied at sidedress. All studies were irrigated.

Yields – 1996

Cotton lint yield responded to broiler litter, starter fertilizer, and foliar fertilizer. Maximum lint yield was attained at a broiler litter rate of about 4 tons/A (Figure 1). The 6-ton rate began to decrease lint yield.

Lint yield was increased further by applications of fluid fertilizers. Applying 10-34-0 increased lint yield 77 lbs/A, and 12-22-5-2S increased yield by 55 lbs/A (Figure 2). KNO_3 sprays increased yield by 68 lbs/A

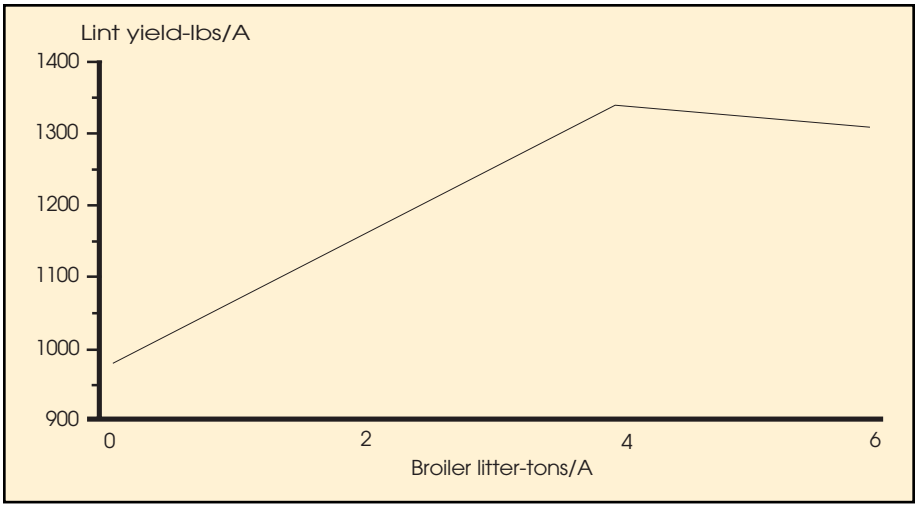

Figure 1. Broiler effect on lint yield, Bednarz and Gascho, University of Georgia, 1996.

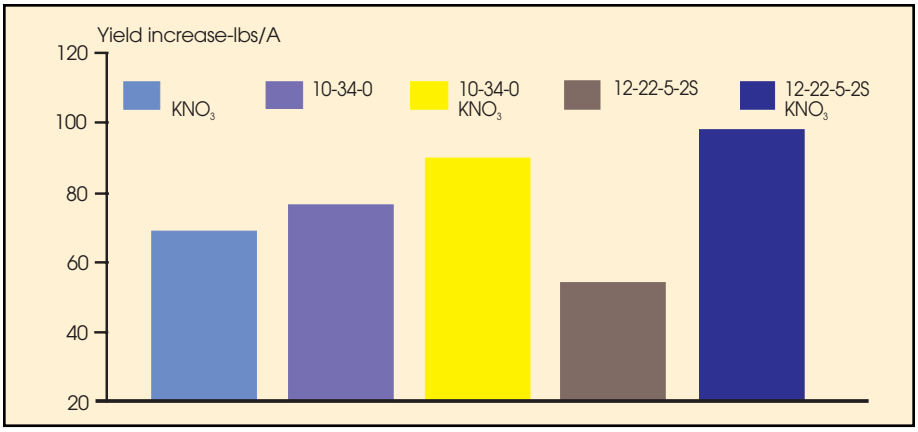

Figure 2. Lint yield response (showing increase only) over all broiler litter rates to inorganic fertilizers, Bednarz and Gascho, University of Georgia, 1996.

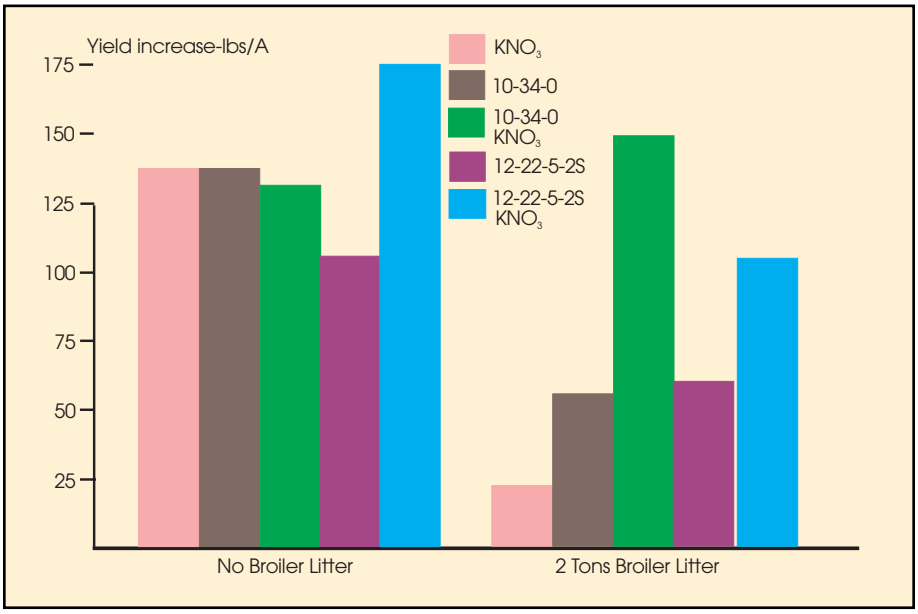

Figure 3. Lint yield response (showing increase only) to foliar at different broiler litter rates, Bednarz and Gascho, University of Georgia, 1996.

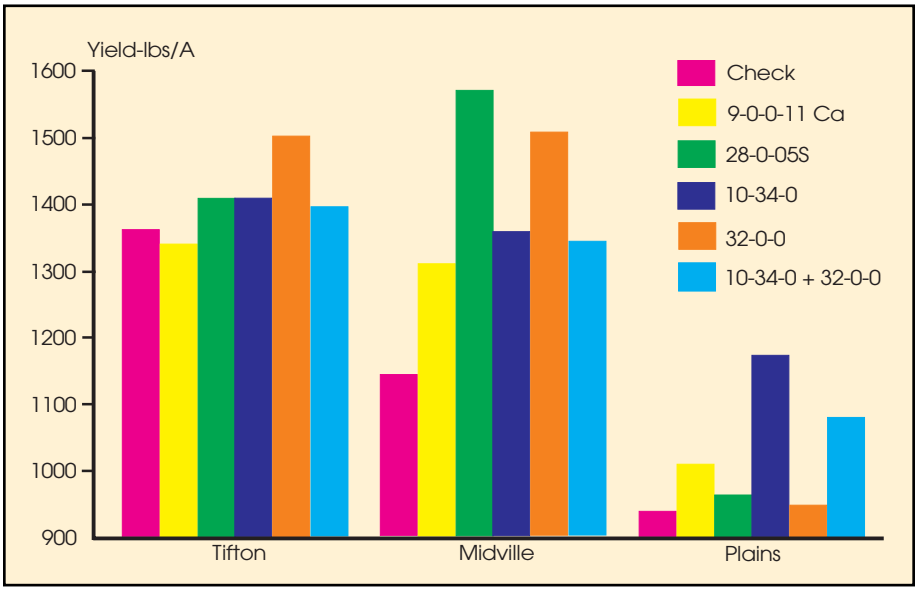

Figure 4. Effects of starter fertilizer on lint yield, Bednarz and Gascho, University of Georgia, 1997.

when no starter had been applied and by an additional 13 to 42 lbs/A when 10-34-0 or 12-22-5-2S was applied as starter. There was not a statistically significant interaction between litter rate and fluid fertilizer treatments for lint yield. However, lint yield response to foliar fertilizer clearly decreased as litter rate increased (Figure 3), indicating that some of the response from the fluids was due to their supply of the same nutrients contained in the broiler litter. It is suggested that additional response from fluids was due to timing of application.

Yields – 1997

In the second series of studies, treatments containing N generally produced yield increases at Midville (Figure 4). Yields were significantly greater than untreated when applying 28-0-0-5S and 32-0-0. At Plains, significant yield increases were observed with treatments containing P. Here, lint yields were significantly greater than untreated when applying 10-34-0 and 10-34-0 + 32-0-0.

At Midville, 32-0-0 produced the highest yield. All treatments received the same amount of fertilizer N. Therefore, starter treatments received more N at planting and less at sidedress. This method of N distribution may be more efficient for Dothan soils.

At Plains, Greenville soils have a high P fixation capacity. Generally speaking, P-containing treatments increased yield relative to untreated areas. P-containing starters applied on cotton may, therefore, have a yield advantage on Greenville soils. The rather large amount of preplant fertilizer used in Tifton may help explain the lack of yield response to starters at this location. In addition, enhanced yield response to starters has been reported when adverse environmental conditions are encountered at planting. Cotton was planted at the Midville and Plains locations in late April. Approximately two weeks of cool, wet conditions were encountered immediately after planting. The Tifton location, however, was not planted until after this period of adverse weather in mid May.

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