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13th Annual National Conservation Systems Cotton & Rice Conference

CORN PRESENTATIONS

Twin-Row Corn Production Moving Forward – Cultivar Selection, Nitrogen Management And Seeding Rates

Presented by Dr. M. Wayne Ebelhar

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Twin-row crop production systems have been adopted on many fields in the Mississippi Delta especially in corn and soybean systems. Producers are investing in equipment that is capable of planting corn or soybean in dual rows (8 to 10 in apart) on the top of prepared raised beds that are spaced at 38 to 40 inches. A multiple-year research program was conducted from 2005 through 2008 in a producer field near Stoneville, MS to evaluate the interaction of nitrogen (N) rates (180, 220, and 260 lb N/ac) and seeding rates (five rates ranging from 24,380 to 40,360 seeds/ac in approximately 3,000-seed increments) for twin-row corn on 38-in beds. The field study consisted of a 3x5 factorial arrangement of N rates and seeding rates with four replications. The study was planted each year on a Bosket very fine sandy loam soil (Mollic hapludalf), following cotton (2005-2007) or corn (2008), with a MonosemJ twin-row vacuum planter (8 to 10 inches between rows). Seeding rates were based on calibration tables supplied by the planter manufacturer. Stand counts, made each year near the time of sidedress N application, indicated that final stands were higher than expected each year. Damage from high winds and rainfall associated with Hurricane Katrina prevented any yield determinations in 2005. The study was rotated to a different field and repeated in 2006. Corn yields with irrigation were excellent. There was significant response to both increasing N rates and increasing seeding rates. Grain yields averaged 249, 252 and 255 bu/ac for the180, 220, and 260 lb N/ac rates, respectively, when adjusted to 15.5 % moisture. Grain yields increased from 222 bu/ac up to 272 bu/ac as seeding rates were increased from 24,380 to 40,360 seeds/ac. Each incremental increase (approximately 3,000 seeds/ac) in seeding rate provided a significant increase in grain yield. While both increased N rate and increased seeding rate significantly increased grain yield, only increased seeding rates provided a significant economic return as the response to increased N was not sufficient to cover the cost of the applied fertilizer material. The 2007 growing season also produced excellent corn grain yields. Again, there was a significant response to increasing N rates, with yields of 245, 246, and 249 bu/ac for the 180, 220, and 260 lb/ac N rates, respectively when averaged across seeding rates. These small differences, even though statistically significant, were not economically significant. Each increase in seeding rate resulted in a subsequent increase in grain yield. The yields were 229, 242, 249, 254, and 259 bu/ac for the respective seeding rates. With higher populations than anticipated, based on calibration tables, producers could be spending more for planting seed than needed. In 2008, corn was grown in the same field as 2007 which meant that corn followed corn rather than some other rotation crop. Monosem™ provided an updated calibration table for 2008 that showed about an 8 to10%

increase in seeding rate with the same settings used in previous years. Stand counts taken in 2008 showed that these seeding rates more closely paralleled actual plant populations and ranged from 28,200 to 43,960 plants/ac. Corn yields in 2008 were lower than harvested in previous years and ranged from 208 to 225 bu/ac. Increasing seeding rates above 37,000 plants/ac did not significantly increase grain yields. Contributing factors probably included a different corn cultivar, corn following corn, and a different growing season. Slow field-drying conditions and periods of unusually high humidity and cloudiness resulted in below average seed quality. There was also no yield advantage to N rates above 220 lb N/ac as would be expected at the lower yield levels. This was different than other years where the highest yields were obtained with 260 lb N/ac.

In the four years of the previously discussed field study, three different corn varieties were grown. Research in this study had shown little economic benefit from increased nitrogen rates some indication that varietal differences could be important. Seed companies have recommended seeding rates for specific varieties as well as various levels of “flex” in their hybrids. Flex can be related to the plants ability to compensate for stand differences. This is common for crops such as wheat, rice, and soybean. Six varieties were evaluated on-farm in 2009 at three seeding rates (30,000, 35,000, and 40,000 seeds/ac). Three Pioneer and three DeKalb varieties were planted in 6-row length-of-field plots with four replications. The varieties were planted with a 12-row planter split with two varieties. All cultural practices were maintained by the producer-cooperator including irrigation and pest control. Responses to seeding rates were different for different varieties as expected. The largest response came with Pioneer ‘31P42’ (28.9 bu/ac) as the seeding rate was increased from 30, 000 to 40,000 seeds/ac. The least response was observed for DeKalb ‘DKC 67-23’ (6.7 bu/ac). The overall field yields ranged from 214.2 to 247.2 bu/ac. Averaged across all seeding rates, Pioneer 31P42 averaged 235.0 bu/ac.

On-farm evaluations with twin-row corn production have led to several recommendations that are keys to successful implementation of the practice. Good beds that are shaped and firm provide the ideal situation for early, uniform stand establishment. Firm and level surface makes it easier to control the planting depth of each row and assures both rows emerging and growing at the same rate. Delays in plant development are compounded through the growing season if one row becomes dominant to the other. Rows planted too near the edge of the bed, can have plants with mal-formed brace roots that can contribute to root lodging. Nitrogen applications are needed on both side of the row to insure adequate fertility to both rows. The same is true of irrigation with water needed down every row. With twin-row planting systems, ground cover is achieved more quickly with less opportunity to cross the field after the crop is planted compared to traditional wide rows (38- to 40-in). Research is still underway to determine how much yield advantage twin-row seeding has to single-row seeding for corn. In single-row, wide-row productions systems, increasing seeding rates tend to produce smaller stalks with less overall stalk strength that lodge more readily.

Influence Of Irrigation, Cover Crop And Nitrogen Rate On Corn Yield On Upland And Mississippi River Alluvial Soils

Presented by Dr. H.J. “Rick” Mascagni Jr.
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Although limited tillage research has been conducted in Louisiana, no-till and minimum tillage research for cotton on the alluvial clays of the Mississippi River and Macon Ridge have shown promise, when compared to the more traditional tillage practices. The inclusion of winter cover crops in combination with conservation tillage was found to be an important component of the systems. Minimum-tillage systems reduce soil erosion, especially on the