

# 2010 Demonstration Report



## THE LEARNING CENTER

at Scott, Mississippi

### Nitrogen Source and Corn Yield

Being one of the most used and expensive crop inputs, nitrogen (N) is an important part of modern crop production. Due to the volatility of N in nature, understanding N sources and proper placement is critical. Effective strategies for N management minimize loss from volatilization, leaching, and denitrification. Denitrification is the conversion of nitrate to gaseous forms of nitrous oxides in the soil. The N found in urea fertilizers can be lost by volatilization if it remains on the soil surface for extended periods of time. The key to the most efficient use of urea fertilizer is to incorporate it into the soil surface by tillage or a minimum of ½ inch of rain within a 36 hour period. Using the right N source and application method may be more important to corn yield potential, than how much N is applied.

Use of urea fertilizer is gaining consideration from Midsouth growers because it is more economical; however, there is risk associated with its use on corn. Urea (46-0-0 or 41-0-0) or urea-containing N sources, including UAN-solution (N-sol, 32%, or 28%), are subject to volatilization loss when applied to the soil surface (either broadcast or dribbled in a band). With increased corn production in the Midsouth, growers faced with additional time constraints due to large acreage are utilizing urea fertilizer as part of their management plan. Due to the increased use of urea in the Midsouth region, a study was conducted at the Monsanto Company Learning Center at Scott, MS to compare the use of urea fertilizer versus UAN solution on corn growth and yield potential.

### Study Guidelines

In 2010, a preliminary study was conducted at the Learning Center at Scott, MS to evaluate how different sources of N effect harvestable corn yield potential. In the trials, two corn hybrids with different relative maturities (117 and 118 RM) were used. In each plot, a corn hybrid was planted at a depth of 2 inches. Irrigation and weed control remained constant for all plots. The N source and application timing were the only variables in this study. In Plot 1, granular urea was used as a single preplant application (Table 1). In Plot 2, urea was used as a 50% preplant application followed by a 50% layby application. Plot 3 utilized UAN 28% solution as a single preplant application. Plot 4 was the traditional UAN 28% solution as a 50% preplant application followed by a

50% layby application. The 5th plot included 50% of the total N as urea applied preplant followed by 50% applied as UAN 28% solution at layby. It is important to recognize that all applications of N fertilizers were properly incorporated into the soil. For all urea application applied preplant, urea was applied prior to bed construction and the raised beds were flattened utilizing a do-all (Figure 2). For all layby applications,

| N Source and Application Timing |   |
|---------------------------------|---|
| Plot 1                          | Urea 100% Preplant                        |
| Plot 2                          | Urea 50% Preplant, 50% Layby              |
| Plot 3                          | UAN Solution 100% Preplant                |
| Plot 4                          | UAN Solution 50% Preplant, 50% Layby      |
| Plot 5                          | Urea 50% Preplant, UAN Solution 50% Layby |

Table 1. N sources and timings.

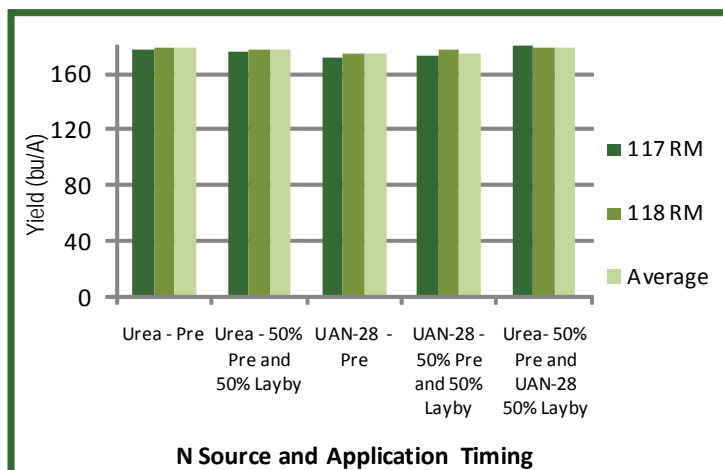


Figure 1. Effect of N source and application timing on corn yield.

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urea was applied prior to cultivation. UAN 28% solution was applied with a coulter/knife applicator with two coulter/knives set at a minimum of 5 inches. Applications of the UAN 28% solution were made at planting and at layby.

### Results

All N treatments evaluated in the study reported similar yield results. Results also demonstrate that under ideal management practices, urea can serve as an excellent N source for Midsouth corn production. Proper N application and incorporation are critical to reduce N losses. Surface application of urea without timely incorporation into the soil can lead to a substantial decrease in N efficiency due to the potential loss via ammonia volatilization.

Next year, the Learning Center at Scott, MS will expand this study to include additional combinations and timing for N applications.

*The information discussed in this report is from a single site, non-replicated, one-year demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.*

### Sources:

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Overdahl, C. J., G. W. Rehm and H. L. Meredith. 1991. Fertilizer Urea. University of Minnesota Extension. College of Agriculture, Food and Environmental Sciences. WW-00638-GO. <http://www.extension.umn.edu/> (verified 12/2/2010).



Figure 2. Do-all used to flatten beds for proper incorporation of preplant N.



Figure 3. Utilizing cultivation to properly incorporate layby N application.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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