Program 4R-2

Implementation Of New Technologies For Improving Fertilizer Use Efficiency

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Nitrogen (N) has become a major expense in rice production and is scrutinized because of its potential to decrease surface water quality and increase global warming. Thus, research continues to be directed towards fine-tuning practices to minimize its loss. Much research has been conducted in the last decade proving that volatilization loss can be minimized with products containing NBPT (Agrotain®, Arborite®, N-Fixx®). Recently, nitrification potential has been quantified in several Mississippi soils where rice is produced. Under real-world production practices, nitrification and subsequent denitrification can be costly with respect to the value of the N lost and in reduced grain yield. In recent years, studies have been conducted to determine the effectiveness of products aimed at minimizing nitrification.

A field study was conducted on a Sharkey clay soil in 2011 and 2012 at the Delta Research and Extension Center in Stoneville, MS. The study evaluated the effectiveness of the nitrification inhibitor dicyandiamide (DCD) and a 43%N sulfur-polymer coated urea product. Fertilizer was applied via urea and the coated N product at two rates (84 and 168 kg N ha-1), and DCD was applied at a 5, 10, and 15% N basis. Both products were applied 14 days before permanent flood establishment (dbf), and the DCD was delivered with urea liquor. The controls included N applied at the same rates without DCD at 14 and 1 dbf. An incorporating rainfall event occurred within 1 d after the 14 d application both years, thus minimizing any potential for volatilization loss. Plots were harvested with a small plot combine and yields adjusted to 12% moisture content. Grain yield data were averaged across year and subjected to analysis of variance and means separated with Fisher's LSD at $\alpha = 0.05$.

Nitrification and subsequent denitrification resulted in 25 to 30% yield loss when urea was applied 14 dbf compared to 1 dbf. When 150 lb N/acre was applied, the rate of DCD was not as important; however, averaged across DCD treatments, rice yield loss was decreased to approximately 8% compared to no DCD. When 75 lb N/acre was applied 14 dbf and DCD supplied 15% of the total N, rice grain yields were only 7% less compared urea alone and applied 1 dbf. The sulfur-polymer coated urea product applied 14 dbf produced grain yields that were approximately 5% less than the urea treatments applied 1 dbf.

These data suggest that ideally, urea should be applied as close to flood as possible. However, in situations where floods can take several days to establish, products like DCD and the sulfur-polymer coated urea could greatly reduce N and yield loss.

Program 2R-2

Recent Progress In Rice Stink Bug (Oebalus Pugnax) Management

Presented by Dr. M.O. Way
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Introduction

The rice stink bug (RSB) is a key pest of rice in the South. This late season pest inserts its mouthparts in kernels of developing rice grains. Enzymes in the insect's saliva break down the contents of the kernel so they can be sucked up by the insect. The RSB also produces a salivary sheath surrounding the stylets which helps lubricate the stylets as they drill into the kernel. Once the stylets are removed, a "volcano-shaped" salivary sheath is left behind on the surface of the kernel. Very high populations of RSB can reduce yield, but more commonly, damage consists of discoloration of grains ("pecky rice") and breakage of kernels which are