

Arkansas Corn and Sorghum Board  
2009 December Progress Report  
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**TITLE:** Helping Arkansas rice farmers exploit market opportunities by improved use of soybean, wheat, and corn in rice rotations.

**OBJECTIVES:**

1. Provide a set of management guidelines that farmers can use to assist them in maintaining their profitability should they change their rotations.
2. Explore the potential of using short-duration rice, soybean, wheat, and corn varieties in a range of crop rotations.
3. Measure the effects of fertility levels and crop sequences on pest and disease incidence in existing and new rotations.
4. Explore the use of conservation tillage in a range of rotations.
5. Determine the feasibility of using corn in rice based cropping systems.
6. Test existing cropping systems models that include the crop species used in this study.

**PROGRESS:**

*Rotation study:* Conventional and no-till plots in the long-term rotation study were planted into Pioneer 33D49 and Pioneer 33M57 on April 7, 2009. Long periods of rainfall early in the season resulted in significant plant losses for all treatments. Later in the season it was evident that much of the corn would be stunted and that yields would be significantly reduced from frequent waterlogged conditions. This was evident at harvest with overall grain yields averaging 75 bu/a. Corn that was rotated with rice averaged 61 bu/a across all treatments while that in a rice-corn-soybean rotation averaged 82 bu/a. The no-till plots remained wet longer than the tilled plots which resulted in a grain yield of only 49 bu/a while the tilled plots averaged 94 bu/a. Increasing fertilizer rates resulted in a significant grain yield increase from 60 to 83 bu/a. This increase was primarily in the no-till plots where the higher fertility yields were similar to the tilled plots. Highest grain yields were obtained using 33M57 which was the same as last season.

*Fertilizer study:* Additional funding was obtained from another source thus we were able to continue work on the deep tillage/fertility study. Three corn varieties (Pioneer 35F40, Pioneer 31P42, and Pioneer 33M57) were planted on April 1, 2009. The following three N rates were used; 1) 100 lbs a<sup>-1</sup>, 2) 150 lbs a<sup>-1</sup>, 3) 200 lbs a<sup>-1</sup>. All N (Agrotain) was applied as a single application when the plants were approximately at the 4 leaf growth stage. Rainfall had less of an impact on this study compared to the rotation study. However grain yields were not as good as the plants appeared; perhaps rainfall had a negative impact on pollination. Over all fertility and variety combinations there was an average gain of 13 bu/a from ripping over not ripping. Fertility had the greatest impact on grain yield with the lowest N level producing 135 bu/a followed by the 150 lbs N/a at 161 bu/a and the highest N rate at 170 bu/a. As in the previous year highest grain yields were obtained using 33M57.