Arkansas Corn and Sorghum Board
2005 Annual Report
Cropping Systems by Merle Anders

TITLE: Helping Arkansas 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.

RESULTS: The two varieties P31B13 and DKC61-25 were planted on April 3; approximately 2 weeks later than was desired. This later date was chosen as a strategy to avoid heavy rainfall that oftentimes occurs early in the season. Generally there are problems with water logging in the no-till treatments when these rain events occur. There were no significant rains early in the season which appeared to benefit the no-till plots where growth was similar to the conventional till plots through much of the season.

Dry grain yields ranged between 54 and 164 bu a^{-1} with both high and low yields in the no-till treatments. Over all treatments, those from the no-till plots were 14 bu a^{-1} lower than those from the conventional-till treatments. For the first time there was a significant increase in grain yields from the enhanced fertilizer treatment over the standard fertility treatment. This result has been observed in the conventional-till plots but not in the no-till plots in the past. A majority of the low yields came from the variety DKC61-25 which appears to be sensitive to wet soil conditions. This variety will be replaced in 2006.

There were indications that the no-till plots were not utilizing nitrogen as efficiently as the conventional till plots later in the season. A similar observation was made in 2004 suggesting that N fertilizer applications need to be either increased or better timed to fit plant needs in the no-till system. In previous years, rainfall following N applications in the no-till plots has resulted in N toxicity thus it is suggested that N applications in no-till plots be limited to no more than 50 lbs N per application and that split applications be made later in the season than is the case with conventional till production. This problem will be addressed in 2006 through the use of Agrotain and/or urea inhibitors. Reduced input costs in our no-till plots suggest this will be the best approach to corn production. To be successful we will need to increase yields through better N management. This work will continue in that direction.

Short Duration Corn Varieties: Planter problems resulted in missing rows in this study. However, we did collect information on plant height and flowering date. One observation was that the ear height for the maturity group I plants was so low that they were within easy reach of raccoons and most were damaged (Table 1). There were a number of varieties that appeared

successful in group II. This work will not continue at Stuttgart but I plan to plant a limited number of early varieties and incorporate them into the tillage-fertilizer work.

Table 1. Comparison of ear height (inches) and plant height (inches) for 24 corn varieties selected from four maturity groups and planted at the University of Arkansas Rice Research and Extension Center, Stuttgart, Arkansas in 2005.

Variety	Maturity group	Ear height inches	Plant height inches	Field notes
G8986YG1/RR	I	25	50	Good*
P39F61YGCB	I	24	48	Good
NKN16-N7	I	24	45	
NX1613	I	24	49	
P39D81	I	23	43	
G8994RR	I	18	41	
G8899YG1/RR	II	27	49	Good
G8948RR	II	24	43	Good
NKN25-J7	II	23	46	Good
NKN27-M3	II	28	50	Good
P39F06YGCB	II	28	54	Good
P39F28HX1,LL	II	28	50	
P39K37YGCB	II	26	52	
G8745YG1/RR	III	28	54	Good
P35Y55YGCB	III	24	48	Good
NKN43-C4	III	29	58	
NKN45-A6	III	28	54	
P37F16YGCB	III	33	56	
P31N28YGCB	IV	33	62	Good
P32D99	IV	38	67	Good
G8287RR	IV	32	62	
G8534YG1/RR	IV	31	60	
G8553RR	IV	43	49	
NX7603	IV	32	64	

- Indicates that a varieties visual performance was exceptional compared to others in that same maturity group.

Mean height for ears in group I was 23 inches; mean height of stalk was 46 inches.
Mean height for ears in group II was 26 inches; mean height of stalk was 49 inches.
Mean height for ears in group III was 28 inches; mean height of stalk was 54 inches.
Mean height of ears in group IV was 28 inches; mean height of stalk was 61 inches.