

ANNUAL REPORT
ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD

December 2001

TITLE: Optimizing Soil Fertility Requirements for Corn

INVESTIGATORS: W.F. Johnson, Jr., and W.J. Ross

COOPERATORS: Claude Kennedy (CBS); Roger Eason (PTS); Ronnie Sherman (RREC);
 and selected corn producers and County Extension Agents

Nitrogen rates and timing

Studies were established at Cotton Branch Station (CBS), Pine Tree Station (PTS) and Rice Research and Extension Center (RREC). At CBS, the previous crop was cotton. Plots were established at PTS and RREC following a previous crop of rice and soybean. The plots were planted in late April. Terral TV 2160Bt was planted at a population of 30,000 seed per acre. CBS row spacing was 38 inches and PTS and RREC was 30 inches. Plot length was 25 feet and 4 rows wide.. Nitrogen treatments consisted of 60 or 90 pounds of N applied pre-plant followed by 60, 90 or 120 pounds of N at the 6-leaf stage. Some the plots received an additional application of N at the pre-tasseling stage. These rates ranged from 40 to 60 pounds of N. All treatments were replicated 4 times in a RCB design. Plots were trimmed to 20 feet prior to harvest. The center 2-rows were harvested for yield determination. Yields were calculated to a moisture content of 15.5%.

Table 1. Corn yield response to differing N rates at the Cotton Branch Station.

Pre-plant N (lbs/a)	Side-dressed N (lbs/a)	Pre-tassel N (lbs/a)	Yield (bu/a)
0	0	0	115c*
60	120	0	169b
90	90	0	170b
60	60	60	188a
60	120	40	182ab
90	90	40	188a

* Means followed by the same letter are not significantly different (P=0.10, LSD).

Table 2. Corn yield response to differing N rates at the Pine Tree Station following Rice.

Pre-plant N (lbs/a)	Side-dressed N (lbs/a)	Pre-tassel N (lbs/a)	Yield (bu/a)
0	0	0	23e*
60	120	0	41e
90	90	0	76d
60	60	60	101c
60	120	40	124b
90	90	40	147a

* Means followed by the same letter are not significantly different (P=0.10, LSD).

Table 3. Corn yield response to differing N rates at the Pine Tree Station following Soybean.

Pre-plant N (lbs/a)	Side-dressed N (lbs/a)	Pre-tassel N (lbs/a)	Yield (bu/a)
0	0	0	120c*
60	120	0	168b
90	90	0	135c
60	60	60	167b
60	120	40	188ab
90	90	40	196a

* Means followed by the same letter are not significantly different (P=0.10, LSD).

Table 4. Corn yield response to differing N rates at the RREC following Rice.

Pre-plant N (lbs/a)	Side-dressed N (lbs/a)	Pre-tassel N (lbs/a)	Yield (bu/a)
0	0	0	9c*
60	120	0	70b
90	90	0	101ab
60	60	60	91ab
60	120	40	104ab
90	90	40	118a

* Means followed by the same letter are not significantly different (P=0.10, LSD).

Table 5. Corn yield response to differing N rates at the RREC following Soybean.

Pre-plant N (lbs/a)	Side-dressed N (lbs/a)	Pre-tassel N (lbs/a)	Yield (bu/a)
0	0	0	24d*
60	120	0	77c
90	90	0	98abc
60	60	60	109ab
60	120	40	91bc
90	90	40	120a

* Means followed by the same letter are not significantly different (P=0.10, LSD).

Table 6. Response of corn yields to phosphorus fertilization following soybean and rice.

P rate	PTS		RREC	
	Soybean	Rice	Soybean	Rice
P ₂ O ₅ /a	bu/a	bu/a	bu/a	bu/a
0	222a*	129a	120a	129a
45	194b	149a	127a	128a
90	213ab	136a	124a	116a
135	202ab	124a	119a	114a
180	220a	118a	145a	127a
225	199ab	139a	137a	123a

* Means followed by the same letter are not significantly different within a column (P=0.10, LSD).

Table 7. Response of corn yields to starter fertilize following cotton, soybean and rice.

11-57-0	CBS	PTS		RREC	
	Cotton	Soybean	Rice	Soybean	Rice
gal/a	bu/a	bu/a	bu/a	bu/a	bu/a
0	148b*	210a	201a	127a	104b
5	167a	215a	212a	128a	138a
10	175a	206a	206a	141a	115b

* Means followed by the same letter are not significantly different within a column (P=0.10, LSD).

Table 8. Sulfur fertilization of corn following soybean at PTS and RREC.

Sulfate-Sulfur	PTS	RREC
lbs/a	bu/a	bu/a
0	190a*	130a
10	194a	130a
20	185a	122a

* Means followed by the same letter are not significantly different within a column (P=0.10, LSD).

Table 9. Zinc fertilization of corn following cotton, rice and soybean.

Zinc Source	CBS		PTS		RREC	
	Cotton	Soybean	Rice	Soybean	Rice	
	bu/a	bu/a	bu/a	bu/a	bu/a	
0	183a*	186a	142a	124a	90a	
Low Seed	182a	177a	137a	141a	108a	
High Seed	177a	190a	157a	117a	114a	
10 lb/a Zn	185a	179a	136a	127a	100a	

* Means followed by the same letter are not significantly different within a column (P=0.10, LSD).