ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD
2004 Annual Summary

Title: Increasing Grain Sorghum Productivity by Maximizing Land Use

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1. Response of grain sorghum to varying nitrogen rates

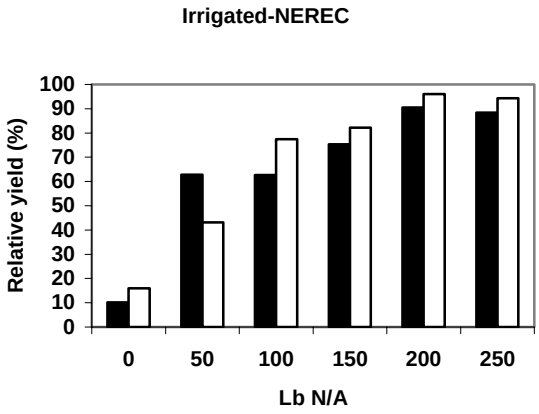
Research plots were established at the Cotton Branch Station (CBS), Pine Tree Station (PTS), Northeast Research and Extension Center (NEREC), and at the Southeast Research and Extension Center (SEREC) at Rohwer. Treatments were arranged in a randomized complete block design with treatment being replicated 4-5 times, depending on the site. A description of the treatments follows:

N rates:
0, 50, 100, 150, 200, and 250 lb N per acre under irrigated conditions
0, 40, 80, 120, 160, and 200 lb N per acre under dryland conditions.

Crops were grown according to University of Arkansas's recommendations.

Results

Relative Yield response of two grain sorghum varieties to varying nitrogen rates under irrigated and dryland conditions at NEREC (Keiser).



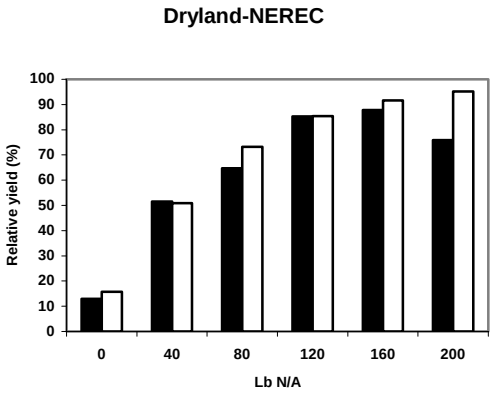


Table 1. Selected soil properties at the NEREC site.

	pH	NO_3-N	P	K	SO_4-S	EC
		---------- lb/A ---------			%	umhos/cm
Irrigated	6.2	15	68	804	33	54
Dryland	6.4	15	72	780	29	57

Relative Yield response of two grain sorghum varieties to varying nitrogen rates under irrigated and dryland conditions at SEREC (Rohwer).

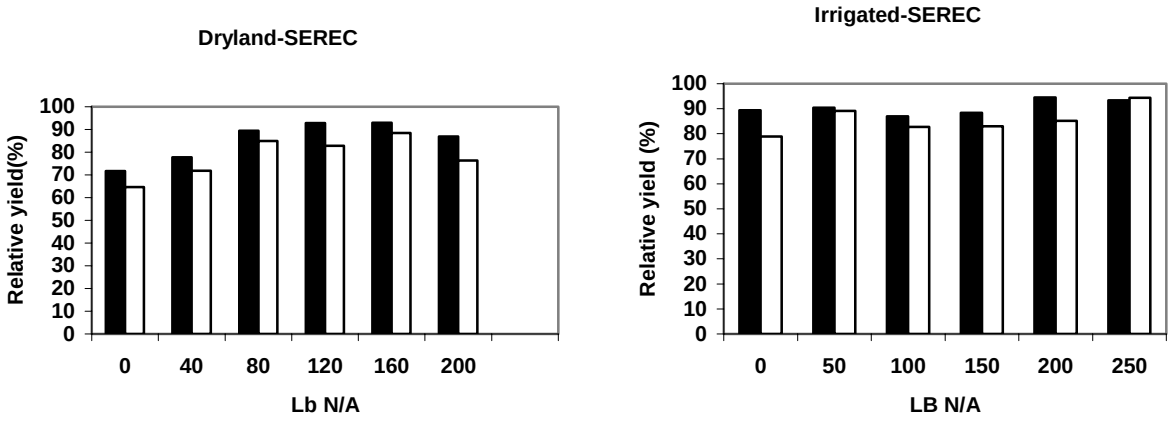


Table 2. Selected soil properties at the SEREC site.

	pH	NO_3-N	P	K	SO_4-S	EC
		---------- lb/A ---------			%	umhos/cm
Irrigated						
0-6	7.3	27	180	438	33	131
6-12	7.0	19	85	356	25	88
Dryland						
0-6	7.9	22	221	451	37	130
6-12	7.2	21	156	300	16	85

Relative Yield response of two grain sorghum varieties to varying nitrogen rates under irrigated and dryland conditions at PTS (Colt).

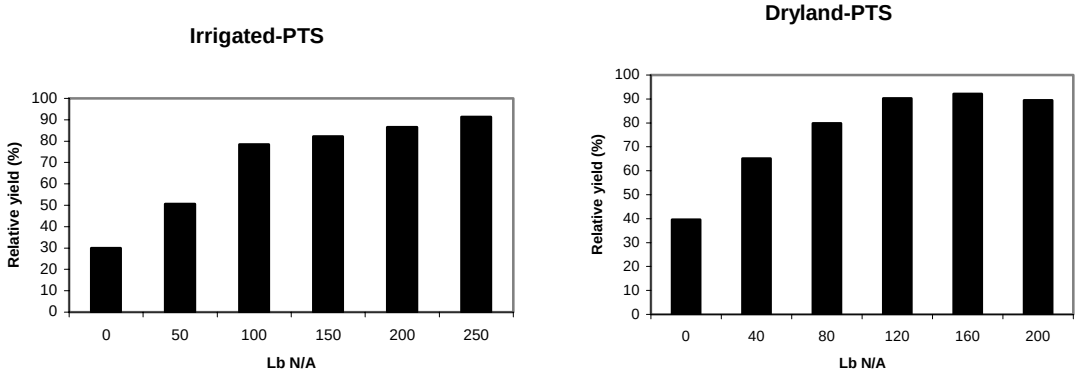


Table 3. Selected soil properties at the PTS site.

	pH	NO_3-N	P	K	SO_4-S	EC
		---------- lb/A ---------			%	umhos/cm
Irrigated						
0-6	6.0	14	51	353	43	35
6-12	5.1	7	22	163	65	26
Dryland						
0-6	5.9	10	39	248	29	26
6-12	5.4	11	18	120	46	27

Relative Yield response of two grain sorghum varieties to varying nitrogen rates under irrigated and dryland conditions at CBS (Marianna).

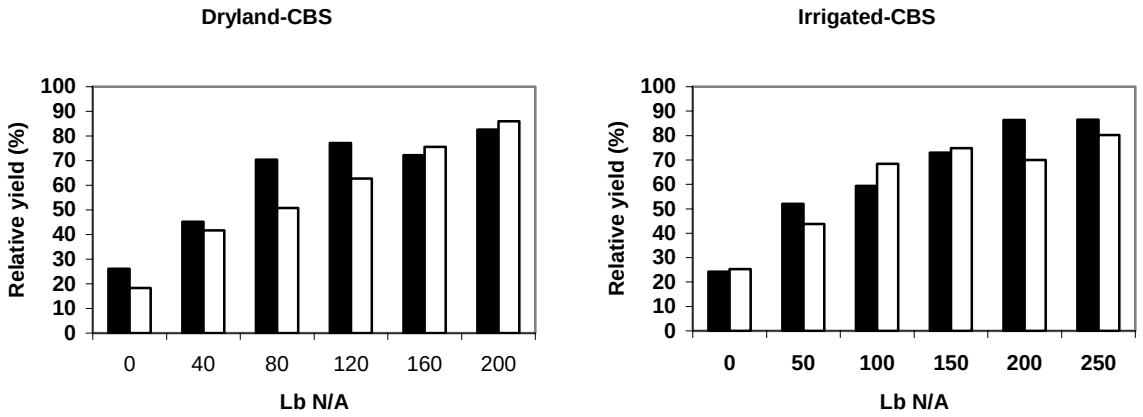


Table 4. Selected soil properties at the CBS site.

	pH	NO_3-N	P	K	SO_4-S	EC
		---------- lb/A ---------			%	umhos/cm
Irrigated						
0-6	6.2	3	99	353	15	30
6-12	5.8	2	73	263	9	24
Dryland						
0-6	6.3	3	110	327	14	21
6-12	5.9	2	85	221	7	12

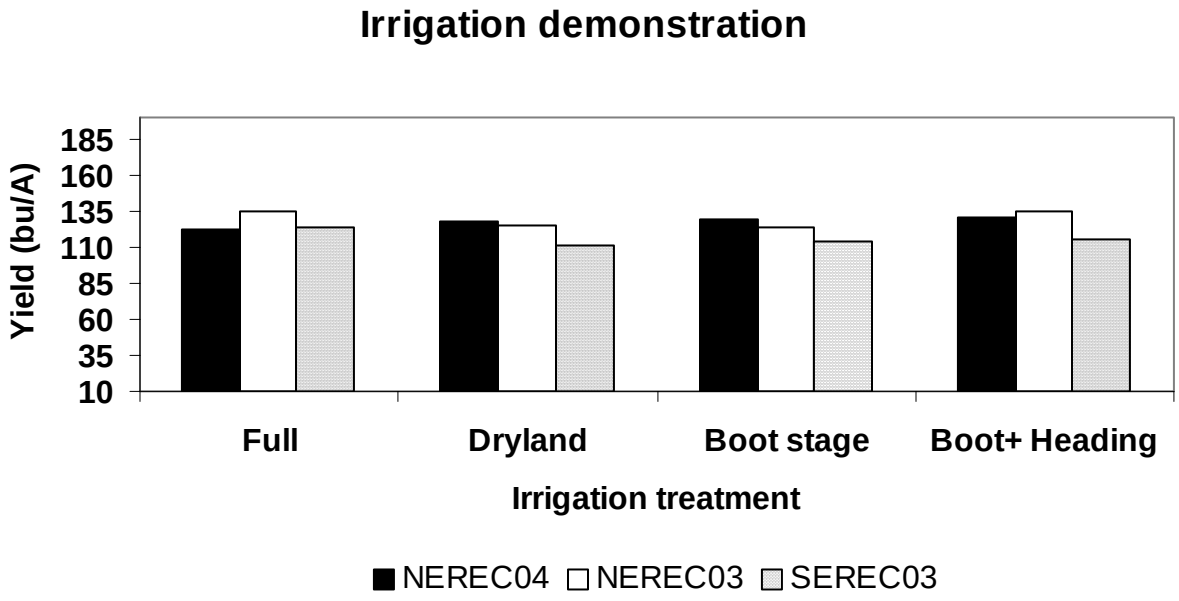
Summary of Findings

There was not an obvious difference in the response of individual varieties to varying nitrogen rates or irrigation regimes. The relative yield response appears to be maximized between 150 – 200 lb/A N for both dryland and irrigated conditions. Soil samples showed very low residual nitrogen (nitrate) at the CBS site (5 lb/A nitrate in 1 ft soil), while the residual nitrogen levels at the PTS and NEREC site were less than 25 lb/A N per foot of soil. The residual-N levels at the

SEREC site were close to 50 lb/A N per foot of soil. This is the probable cause for the lack of response observed at such location, and underlines the importance of soil testing for residual nitrogen. More data is needed to further characterize the yield response of grain sorghum under different soil conditions and residual nitrogen levels.

1. Grain sorghum irrigation demonstration.

Treatments consist of full irrigation, dryland, one irrigation at the boot stage, and one irrigation at boot stage plus one at heading. Each treatment was replicated four times.



The 2003 and 2004 growing seasons were characterized by rainfall amounts above normal such that yield potential under dryland conditions was similar to that under irrigated conditions. Yields form the different treatments, during 2004 at NEREC, were not statistically different from each other. However, in 2003, yields under irrigated conditions were significantly higher than those under non-irrigated conditions (@ 13 bu/A difference). Results from the SEREC site showed no significant differences among treatments.

Results of these studies should be used with caution since the study was conducted during two years with rainfall distribution that allowed for increasing yield potentials. These studies were not conducted during the 2002 season, when grain sorghum yields were severely affected by lack of rainfall.