

## ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD

**Title:** Increasing Grain Sorghum Productivity by Maximizing Land Use

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### 1. Response of 3 sorghum hybrids 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. A description of the treatments follows:

**Sorghum hybrids:**

Pioneer 84G62, Terral 1050, and Triumph TR82-G.

**N rates:**

0, 50, 100, 150, 200, and 250 lb N per acre under irrigated conditions

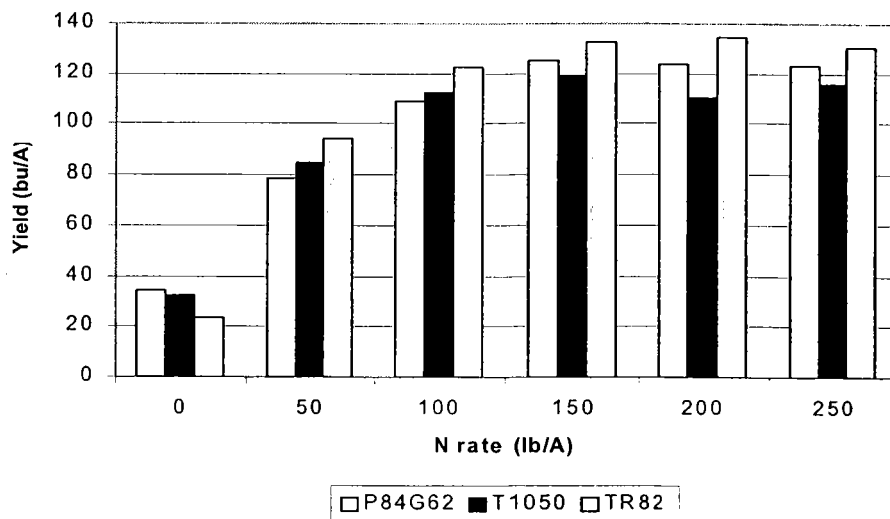
0, 40, 80, 120, 160, and 200 lb N per acre under dryland conditions.

**Approach:**

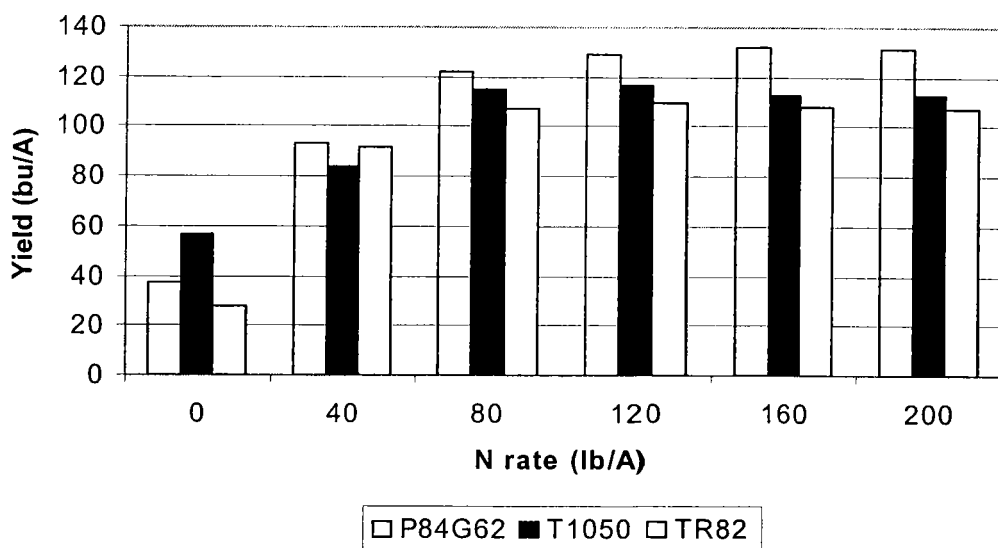
Intended plant density was 8 seeds per foot (irrigated, 38" rows); 6 seeds per foot (dryland, 38" rows); 6-7 seeds per foot (irrigated, 30" rows); 4-5 seeds per foot (dryland, 30" rows).

Plots were seeded on 4/17, 4/28, 4/17, and 4/23 at PTS, CBS, NEREC, and SEREC respectively. Trials at PTS were lost due to excessive rainfall, plots were re-seeded but were lost for a second time due to adverse weather conditions. Adverse weather conditions masked the treatment effect at CBS.

Nitrogen rates were applied in equal splits at or near planting and at the 6-8 leaf stage (knee high). Plots consist of 4 rows, 25 ft long and are replicated 4 or 5 times.



**Figure 1.** Grain sorghum response to varying N-rate under irrigated conditions at NEREC.



**Figure 2.** Grain sorghum response to varying N-rates under dryland conditions at NEREC.

There was an obvious response to N rates at all the test sites, with grain sorghum yield being maximized at an equivalent rate of 150 - 160 lb N/A at most sites under irrigated conditions. Yields from plots under dryland conditions were considerably higher than those obtained during the 2002 season. Favorable weather conditions at critical growth stages contributed to this effect. Obtained yields ranged from nearly 50bu/A to 132 bu/A for both the irrigated and dryland test plots. Similar results were obtained from the test plots at SEREC. Plots at the Pine Tree Station were abandoned due to consecutive flooding events, which reduced the desired plant population.

## 2. 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. Two hybrids were planted in strips, typically 150 ft long, replicated 4 times.

### **Preliminary results:**

Favorable weather conditions during the 2003 season resulted in yields comparable to those obtained under irrigated conditions from test sites at NEREC and SEREC (Table 1). A significant yield response was observed with one of the grain sorghum varieties at NEREC. Yields for the full irrigation treatment and the “2 irrigations” were statistically higher than the “dryland” and the “1 irrigation treatment”

**Table 1.** Grain sorghum yields (bu/A) under different irrigation regimes at NEREC and SEREC, during the 2003 season. Numbers with same letter are not statistically different at a 90% significance level.

Treatment	Pioneer 82G62		TR82G	
	NEREC	SEREC	NEREC	SEREC
<b>Full irrigation</b>	135.1a	124a	130.9a	118a
<b>No irrigation</b>	124.7b	111a	127.6a	110a
<b>1 irrigation</b>	123.3b	114a	127.6a	113a
<b>2 irrigations</b>	134.5a	115a	128.2a	110a

### **3. Assessing the yield potential of grain sorghum at varying planting arrangements.**

The Terral 1050 hybrid was seeded under varying planting configurations: single row; double row (2 rows per bed); triple row (three rows per bed); flat (22.5 in apart on flat ground) at the Cotton Branch Station under varying nitrogen rates (0, 50, 100,150,and 200 lb N/A).

Background information is being collected to develop fertilizer and plant population recommendation packages. Treatment effects for the current season may have been masked by adverse weather conditions at planting, results are not presented at this time.