

**2005 RESEARCH PROGRESS REPORT**  
**ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD**  
**NOVEMBER 30, 2005**

**Project Title:** Management Practices to Increase Grain Sorghum Productivity.

**Principle Investigators:** Jason Kelley, Extension Agronomist - Wheat and Feed Grains  
Leo Espinoza, Extension Agronomist - Soils

**STATUS:** Completed year 2 of 3

**OBJECTIVES:**

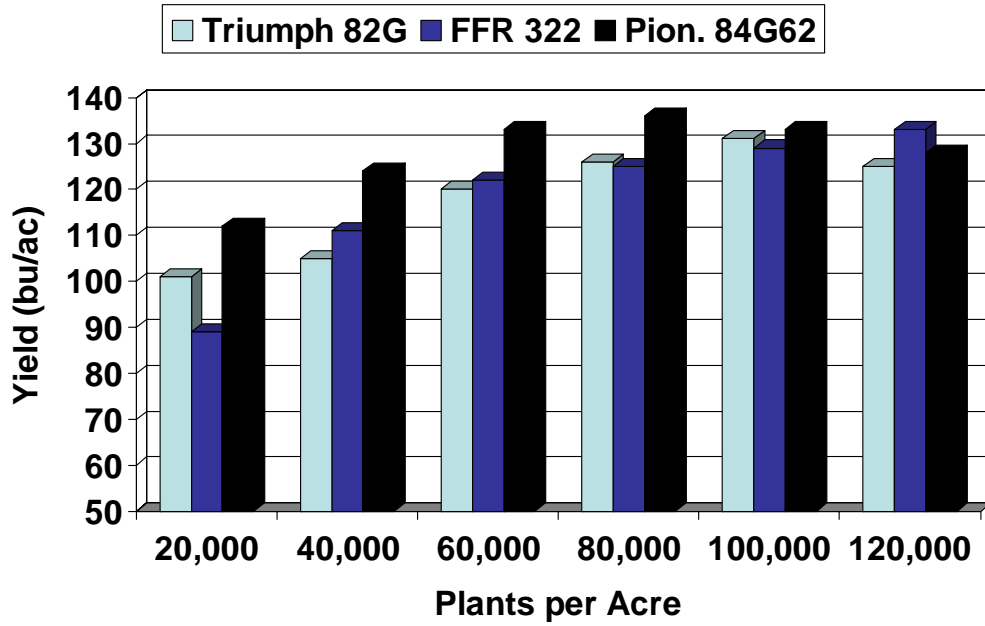
**1. Determine Optimum Plant Populations for Maximum Yield Under Irrigated and Dryland Grain Sorghum Production Systems.**

Research trials were conducted at the Northeast Research and Extension Center (NEREC), Pine Tree Station (PTS), and the Southeast Research and Extension Center (SEREC) evaluating three grain sorghum hybrids at plant populations of 20,000, 40,000, 60,000, 80,000, 100,000, and 120,000 plants/acre. Grain sorghum hybrids evaluated included Triumph 82G, FFR 322, and Pioneer 84G62. Plots were planted in late April and row spacing was 38 inches at NEREC and SEREC and 30 inches at PTS. All experiments were planted on raised beds. Irrigated plots were furrow irrigated four to six times during the growing season at all locations.

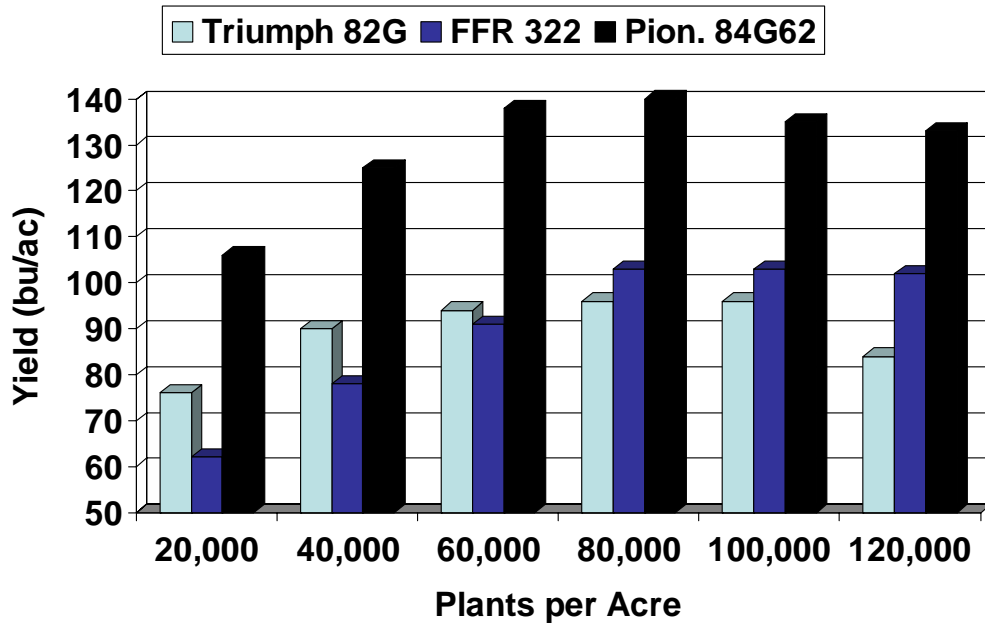
Experimental design was a randomized complete block with a factorial arrangement of treatments. Treatments were replicated four times. Plots were 20 or 25 ft long and 2 or 4 rows wide, depending on location. Standard weed control consisting of Dual II Magnum + Atrazine was used in all trials. Nitrogen fertility was consistent between irrigated and dryland at each location and ranged from 125 to 150 lbs of nitrogen per acre applied preplant or preplant + sidedress. Phosphorus and Potassium were applied according to soil test recommendations.

Grain yields from each location are shown in charts below. Plant populations of 20,000 plants/acre were too low to maximize grain yield at any location, regardless of irrigation practice or hybrid, but in many instances yields were higher than expected. At SEREC under irrigation all hybrids performed similar with exceptional yields. Yields tended to be maximized at approximately 80,000 plants/acre. Without irrigation at SEREC, hybrids differed widely in their yields with Pioneer 84G62 yielding near irrigated levels, while other hybrids yielded less. Yields were again maximized near 80,000 plants/acre. At PTS, in a lower yield environment hybrids performed similar and yields tended to be maximized by plant populations near 80,000 for both irrigated and non-irrigated. At NEREC, yields were very high with irrigation and hybrids performed similar. Yields were again maximized with populations near 80,000.

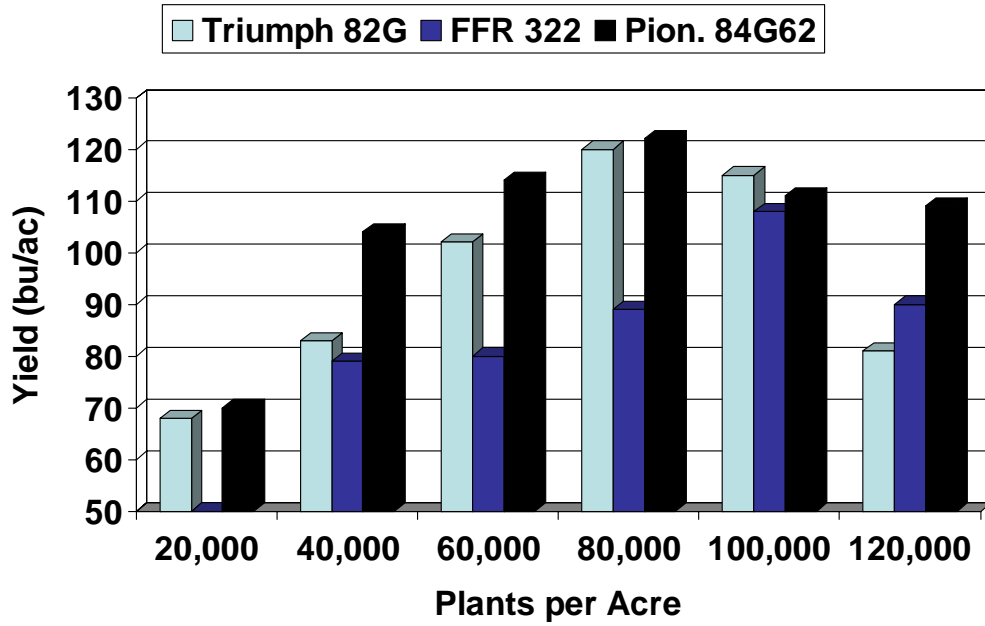
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at Rohwer, 2005



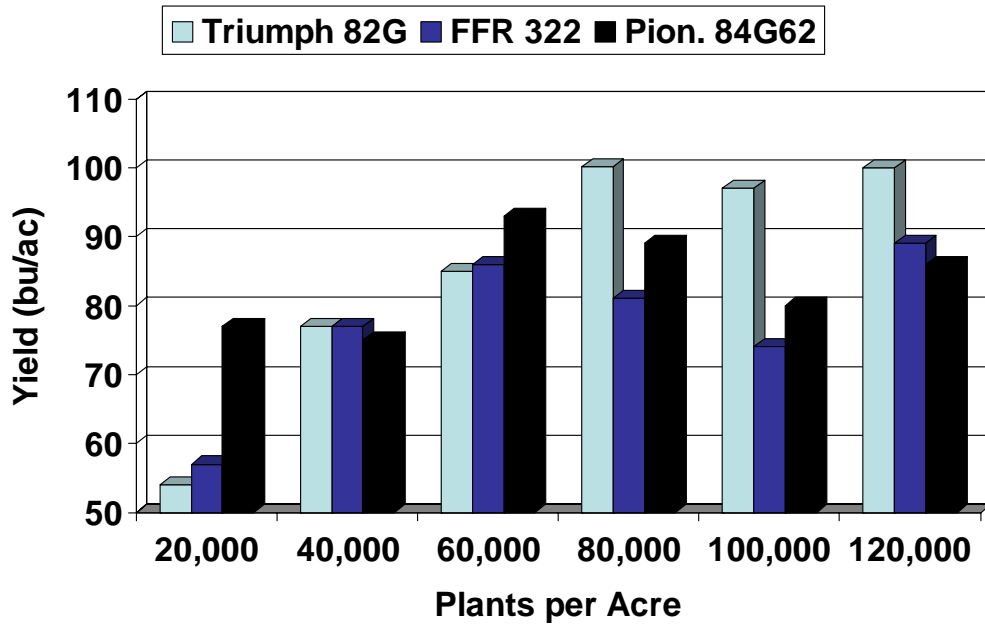
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at Rohwer, 2005



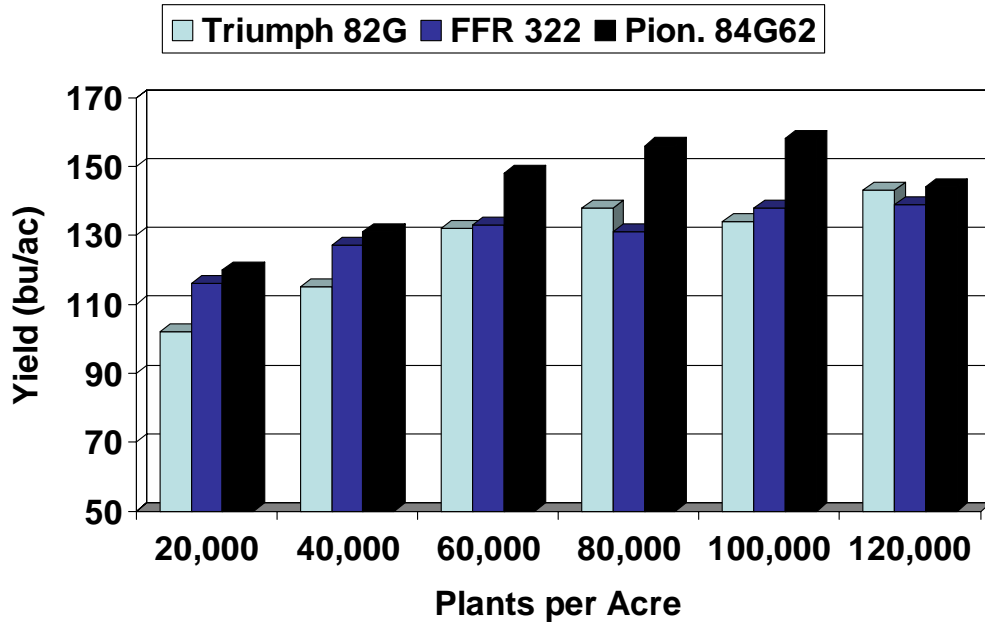
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at PTS, 2005



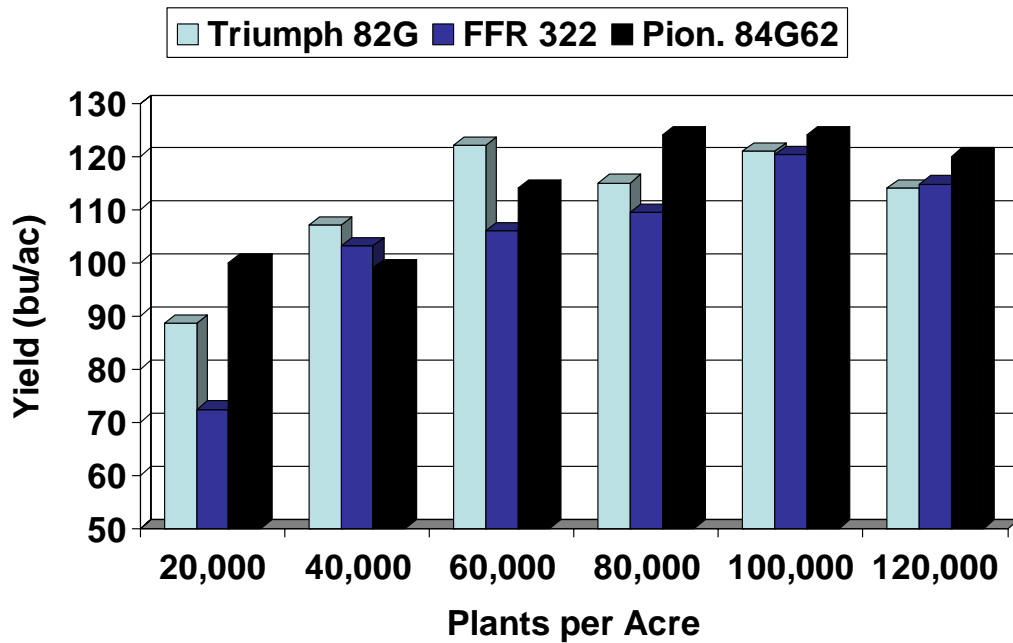
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at PTS, 2005



Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at NEREC, 2005



Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at NEREC, 2005



## Objective 2:

### Determine effect of starter fertilizer on grain sorghum yield.

Field experiments were conducted at NEREC and SEREC evaluating the effects of starter fertilizer placed in-furrow at planting on grain yields of irrigated grain sorghum. Starter fertilizer treatments consisted of 30 lbs/acre of 0-46-0, 20 lbs of 46-0-0, or 30 lbs of 18-46-0. Triumph 82G was planted in April to achieve a population of 75,000 plants/acre. Cultural practices included; 38 inch row spacing, furrow irrigation, Dual + Atrazine for weed control and 150 units of nitrogen fertilizer applied preplant + sidedress. Phosphorus and Potassium were applied according to soil test recommendations.

Effects of starter fertilizer were not visually pronounced during the growing season. Temperatures at planting and during the early season were warm and plant growth was not retarded by cool wet conditions in which starter fertilizer effects might have been seen. Yields were high at both locations and variability from plot to plot was low, but no statistical differences were found in grain yield for any of the treatments.

Effect of starter fertilizer placed in-furrow at planting on grain sorghum yield (bu/a).		
	Location	
Treatment	NEREC	SEREC
No Starter Fertilizer	112.8	123.1
0-46-0 at 30 lbs/acre	123.4	126.4
46-0-0 at 20 lbs/acre	124.8	124.8
18-46-0 at 30 lbs/acre	117.9	129.1
LSD (0.05)	NS	NS