2006 RESEARCH PROGRESS REPORT

ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD

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 3 of 3

OBJECTIVES:

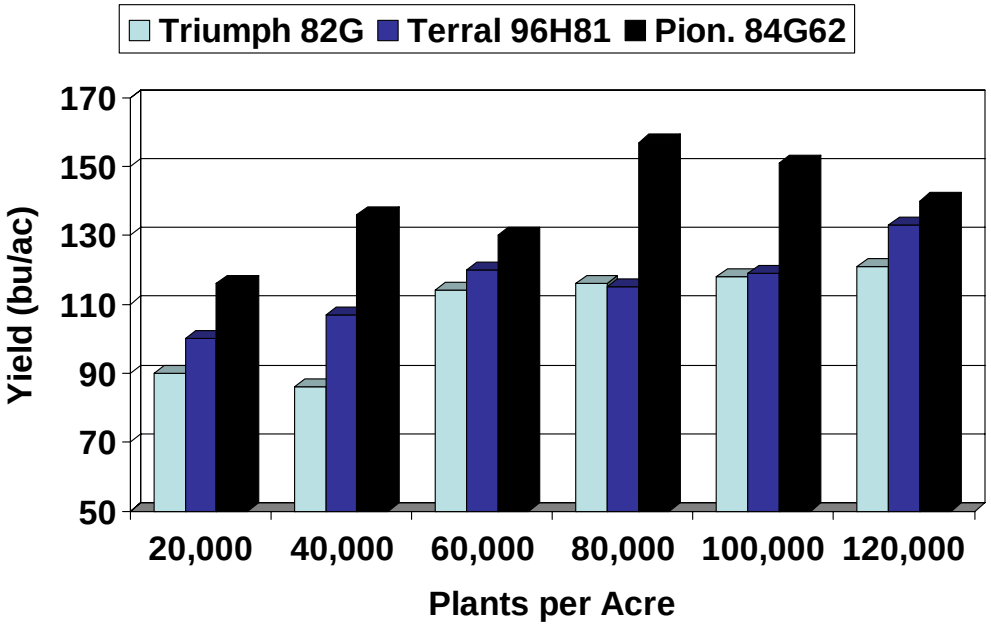
1. **Determine Optimum Plant Populations for Maximum Yield Under Irrigated and Dryland Grain Sorghum Production Systems.**

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, Terral 96H81, and Pioneer 84G62. Plots were planted in 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 watered as needed and were furrow irrigated two to six times during the growing season depending on location.

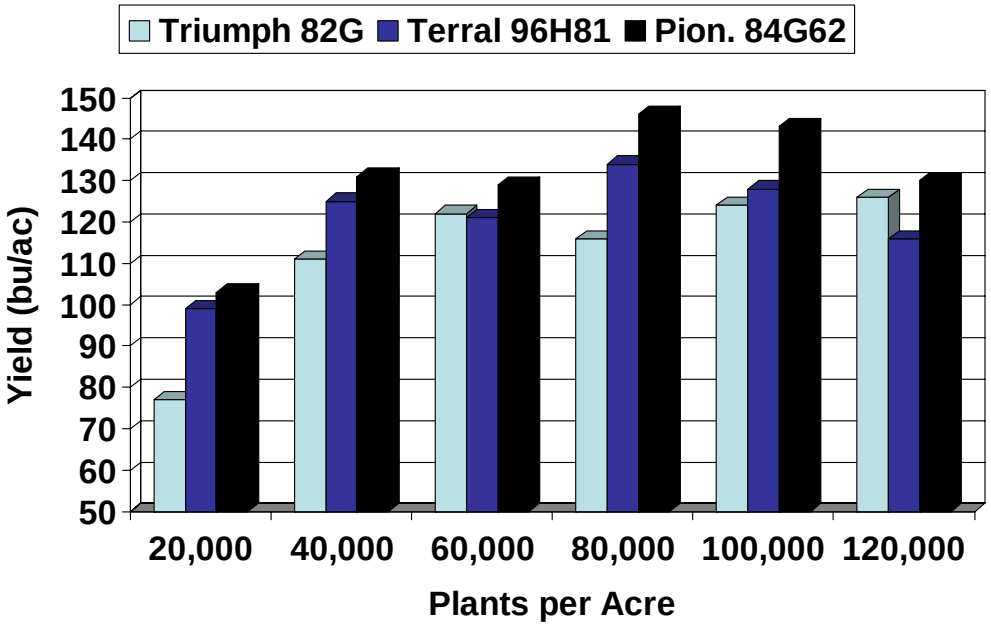
Experimental design was a randomized complete block with a factorial arrangement of treatments. Treatments were replicated four times. Plots were 20 or 25 ft long and 2 or 4 rows wide, depending on location. Standard weed control consisting of Dual II Magnum + Atrazine was used in all trials. Nitrogen 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 without irrigation all hybrids performed similar with exceptional yields. Yields tended to be maximized at approximately 60,000 to 80,000 plants/acre. With irrigation at SEREC, hybrids differed widely in their yields with Pioneer 84G62 yielding higher than other hybrids, but yields were again maximized near 80,000 plants/acre. At PTS, large differences in yield were seen between irrigated and non irrigated plots but hybrids performed similar in each environment with yields being maximized with near 80,000 plants/acre. At NEREC, yields were very high with or without irrigation and hybrids performed similar. Yields were again maximized with populations near 80,000 plants/acre.

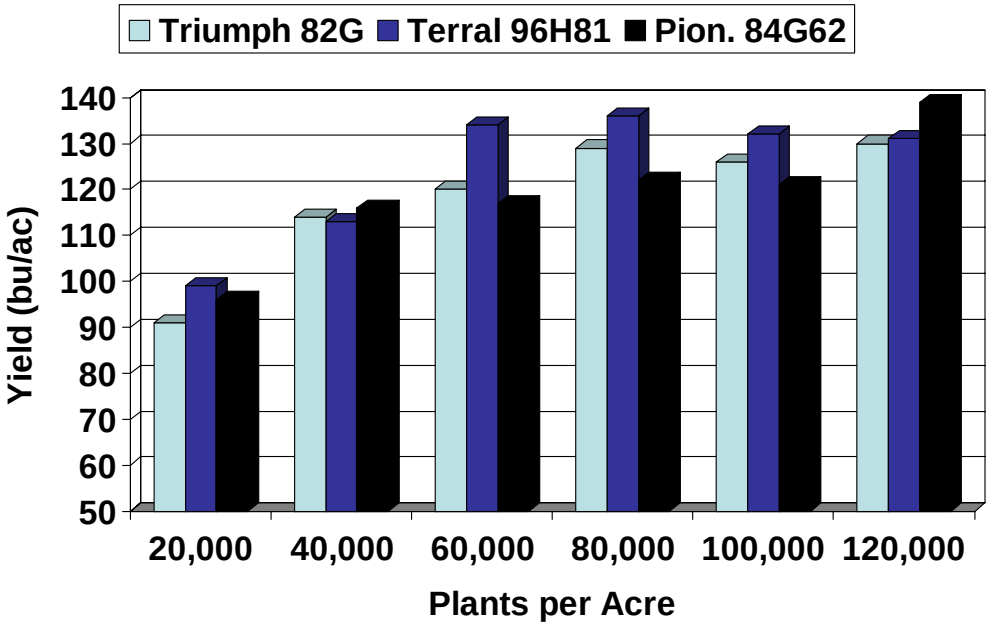
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at Rohwer, 2006



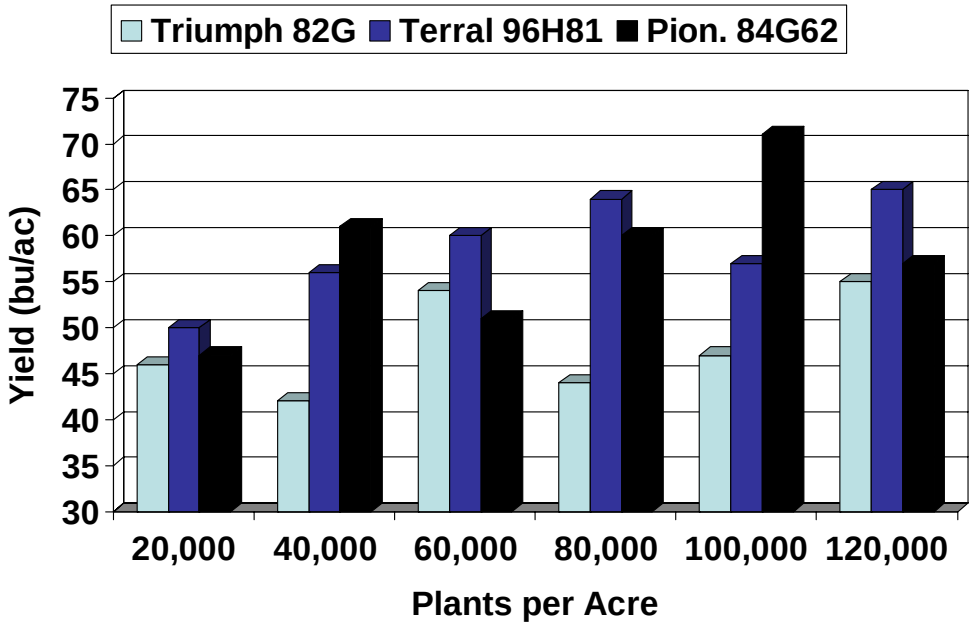
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at Rohwer, 2006



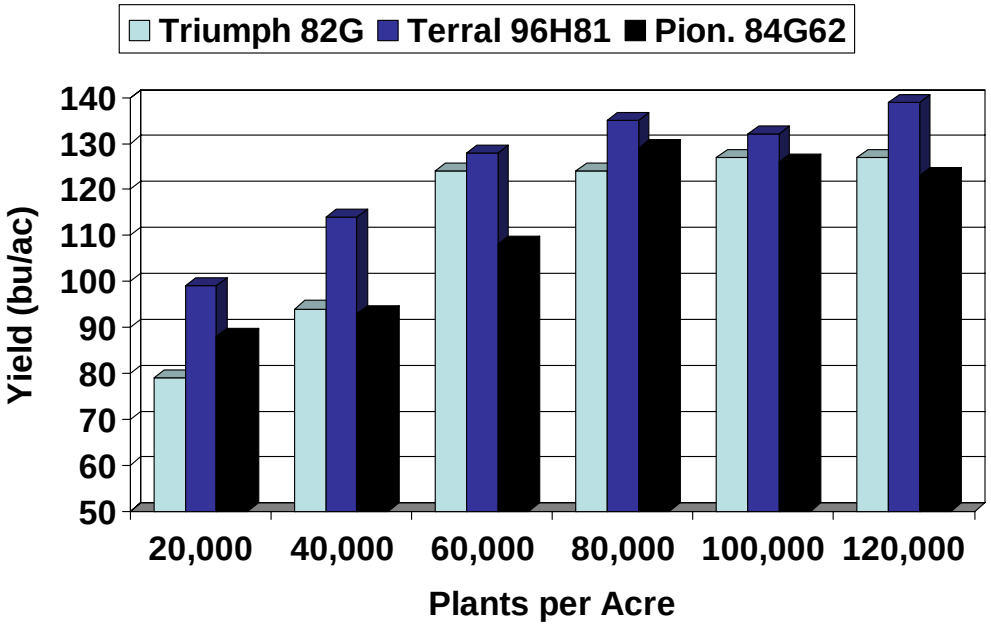
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at PTS, 2006



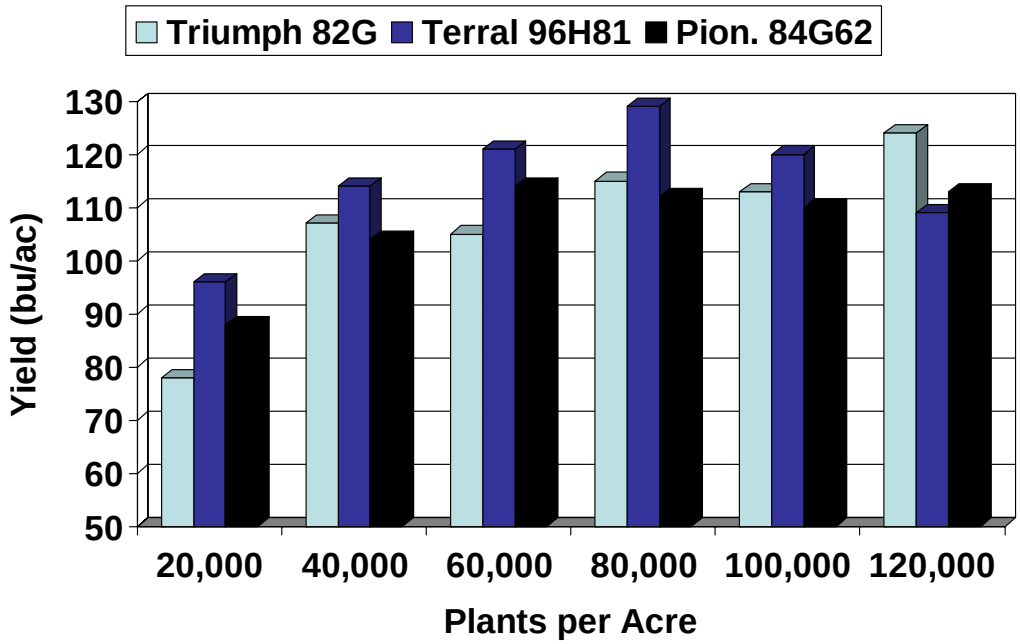
Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at PTS, 2006



Effect of Plant Population and Hybrid on Grain Sorghum Yield under Irrigated Conditions at NEREC, 2006



Effect of Plant Population and Hybrid on Grain Sorghum Yield under Non-Irrigated Conditions at NEREC, 2006



Objective 2:
Determine effect of starter fertilizer on grain sorghum yield.

Field experiments were conducted at NEREC, SEREC, and PTS 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 approximately 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 were warm, but cool weather soon after emergence in late April retarded early season growth temporarily - conditions where starter fertilizer might be beneficial. However, no early season affects from starter fertilizer were seen. Yields were high at NEREC and PTS, where grain sorghum had optimum growing conditions; however starter fertilizer had no impact on yield. At SEREC, yields were more variable, but again, no impact from starter fertilizer was seen at any point in the growing season.

Effect of starter fertilizer placed in-furrow at planting on grain sorghum yield (bu/a).

	Location		
Treatment	NEREC	SEREC	PTS
No Starter Fertilizer	144.7	83.1	133.4
0-46-0 at 30 lbs/acre	149.5	71.2	134.1
46-0-0 at 20 lbs/acre	146.4	79.5	129.6
18-46-0 at 30 lbs/acre	147.6	70.4	130.1
LSD (0.05)	NSD	NSD	NSD