

**Arkansas Soybean Promotion Board
Summary of 2007 Funded Research**

Project Title: Investigating Emerging Production Recommendations for Sustainable Soybean Production

Objective: Implement an early-season variety test for silt-loam soils in Northeast Arkansas.

Investigator: Dr. Jeremy Ross

An Early-Planted Variety Test was planted in Poinsett County (Matthews Farm) that consisted of 121 entries with 4 replications ranging from maturity groups 3.7 to 5.3. This site was chosen for the soil-texture (silt-loam) and production system (following rice) in order to increase our database of variety performance in this area under these conditions. In 2007, the Poinsett County Extension staff conducted a Rice/Soybean field day attended by over 250 producers, consultants, and other agri-industry personnel. This research was included as part of this tour.

Objective: Continue to investigate optimum seeding rates and planting methods of soybean under a wide range of geographic regions, soil types, and production systems.

Trial Title: Determining the feasibility of twin-rows in an irrigated soybean production system

Investigator: Drs. Daniel Stephenson and Jeremy Ross

A field experiment was conducted at the Northeast Research and Extension Center in Keiser in 2007. Two factors were evaluated including soybean seeding pattern and rate. Treatments was replicated four times and plot size was 12.67-ft wide (4, 38-inch raised beds) by 30-ft long.

A maturity group IV soybean (Pioneer 94B73) was planted on a smooth, flat soil surface and overhead irrigated during the season. Soybean seeding patterns included: (1) 7-inch drill seeded rows; (2) 15-inch rows; and (3) twin-rows (two rows spaced 7.5-inches apart with each set separated by 38-inches) seeded on May 24th. Soybean was replanted on June 5th because an adequate stand was not achieved due to poor seed germination following the first planting. Seeding rates included: (1) 100,000; (2) 130,000; and (3) 160,000 seeds per acre. All seeding patterns and rates emerged on June 11th. A labeled rate of glyphosate was applied on July 5th and 18th for weed control. No insecticide or fungicide was applied during the growing season. Soybean received a total of 13.25-inches of overhead irrigation during the growing season.

Soybean plant densities and heights were recorded periodically. Additionally the dates of the R1 and R6 soybean growth stage were recorded. During the growing season, photosynthetically active radiation (PAR) was recorded using a LI-COR LI-191SR 1-meter line quantum sensor which allows observation of light captured by the plant canopy. At physiological maturity, three plants per plot were hand-harvested to determine soybean pod

number per plant and yields were collected with a mechanical harvester. Yields were adjusted to 13% moisture for presentation.

Results and Discussion

Soybean reached the R1 and R6 growth stages on July 22nd and August 20th, respectively. Regardless of seeding rate, plant survival was 88, 70, and 65% for 7-inch drill seeded, 15-inch, and twin-row seeding patterns, respectively. Additionally, 61, 83, and 79% plant survival was observed for the 100,000, 130,000, and 160,000 seeds/acre seeding rates. No differences in plant height on July 12th and October 2nd was observed with all seeding patterns and rates averaging 15 and 34-inches tall, respectively for each observation date. No differences among seeding patterns was observed for captured PAR with an average of 1231 $\mu\text{mol}/\text{sec}/\text{m}^2$ on August 2nd; however, captured PAR increased with increasing seeding rate. At time of PAR data collection on August 2nd, soybean growth stage was R3 and above canopy PAR was 1310 $\mu\text{mol}/\text{sec}/\text{m}^2$. On August 20th, no differences were observed for captured PAR regardless of seeding pattern or rate with captured PAR averaging 1339 $\mu\text{mol}/\text{sec}/\text{m}^2$ and an above canopy PAR of 1551 $\mu\text{mol}/\text{sec}/\text{m}^2$. Number of soybean pods per plant was not influenced by soybean seeding pattern or rate with an average of 75 pods per plant observed. Soybean yield was influenced by seeding pattern and rate (Table 1).

Table 1. Effect of seeding pattern and rate on soybean yield.

	Seeding Pattern	Seeding Rate	
	Bushel/Acre		Bushel/Acre
7-inch drill seeded	58 a	100,000 seeds/acre	50 b
15-inch	61 a	130,000 seeds/acre	58 a
Twin-row	47 b	160,000 seeds/acre	58 a

Overall, data indicates that decreasing seeding pattern and increasing seeding rate provides an increase in soybean yield when compared to the twin-row seeding pattern. However, these conclusions follows only one year of research. Further research needs to be conducted to validate these conclusions.