Effect of Seeding Pattern and Rate on Soybean Growth and Yield

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INTRODUCTION

Soybean seeding patterns and rates that would provide increased productivity are of great interest to producers. Various seeding patterns and rates are used to achieve profitable yields by Mid-Southern U.S. soybean producers. Recently, an alternative seeding pattern has begun to gain interest among producers in which two rows (19-cm apart) are seeded with each set of rows separated by 97-cm. This pattern is typically know as a twin-row system. Research was conducted by the University of Arkansas Division of Agriculture in two separate trials to investigate the feasibility of this new system and other traditionally used soybean seeding patterns and rates in Arkansas.

OBJECTIVE

To determine the effect of various planting patterns and seeding rates on soybean growth and yield.

MATERIALS AND METHODS

- Both trials conducted in 2007 at the University of Arkansas Northeast Research and Extension Center in Keiser.
- A randomized complete block arranged in a split-plot experimental design with four replications was used for both trials.
- Trial 1: Main plot soybean maturity group (MG): 1) MG III (Pioneer 93M90); 2) MG IV (Pioneer 94B73); and 3) MG V (Pioneer 95M50). Sub-plot planting patterns: 1) 97-cm single-row spacing; 2) 19-cm twin-row spacing with each set of twin-rows separated by 97-cm. Sub-sub-plot soybean seeding rates: 1) 90 kg ha^{-1}; 2) 112 kg ha^{-1}; 3) 135 kg ha^{-1}; 4) 157 kg ha^{-1}; and 5) 179 kg ha^{-1}.
- Trial 2: Main plot soybean seeding pattern: 1) 18-cm; 2) 38-cm; and 3) 19-cm twin-row spacing with each set of twin-rows separated by 97-cm. Sub-plot seeding rates: 1) 112 kg ha^{-1}; 2) 146 kg ha^{-1}; and 3) 179 kg ha^{-1}. Only the MG IV soybean (Pioneer 94B73) was seeded in this trial.
- Data presented includes pod number per plant and soybean yield in both trials.
- Data were subjected to ANOVA with means separated by Fisher's Protected LSD test at P = 0.05.

Figure 1. Soybean maturity group, seeding pattern and rate effect on pod number per plant at harvest in trial 1.

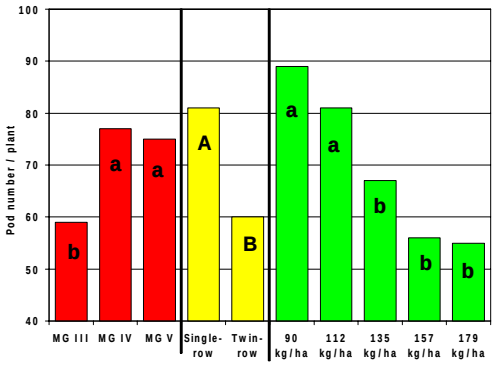


Figure 2. Soybean seeding pattern and rate effect on pod number per plant at harvest in trial 2.

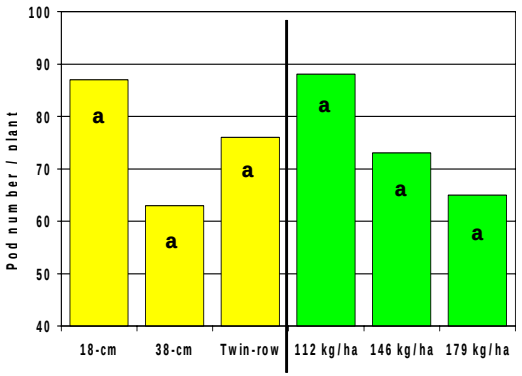


Figure 3. Effect of the interaction of soybean maturity group and seeding pattern on yield in trial 1.

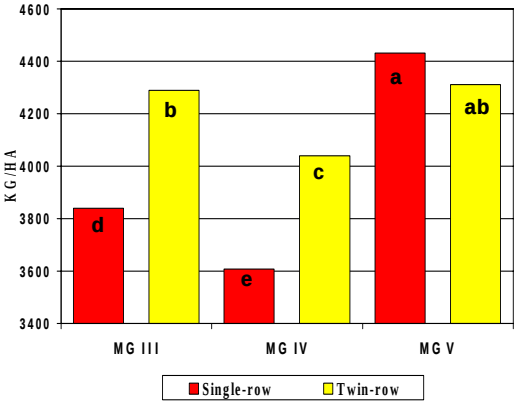
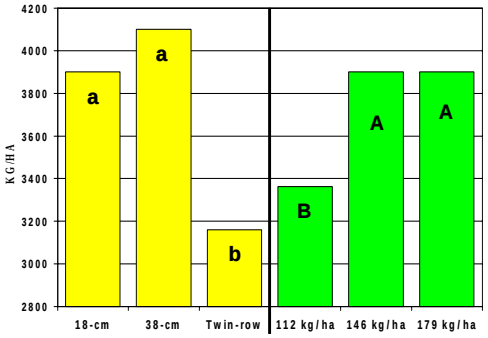


Figure 4. Soybean seeding pattern and rate effect on yield in trial 2.



RESULTS AND DISCUSSION

- Greater pod number per plant was observed for the MG IV and V soybean compared to the MG III soybean in trial 1 (Figure 1).
- In trial 1, the 97-cm single-row seeding pattern provided greater soybean pod number per plant compared to the twin-row seeding pattern (Figure 1). Seeding pattern did not influence pod number per plant in trial 2 (Figure 2).
- In trial 1, greater pod number per plant was observed with lower seeding rates (Figure 1); however, no differences were observed for seeding rate in trial 2 (Figure 2).
- In trial 1, the twin-row seeding pattern yielded greater than the 97-cm single-row seeding pattern in MG III and IV soybean, but no difference was observed in MG V soybean (Figure 3).
- In trial 2, the 18- and 38-cm seeding pattern yielded greater than twin-row seeding pattern (Figure 4).
- Seeding rate did not influence yield in trial 1 (data not shown). In trial 2, yield increased with increasing seeding rate (Figure 4).

CONCLUSIONS

- Preliminary observations indicate the feasibility of a twin-row seeding pattern in a soybean production system that wishes to utilize a wide-row seeding pattern system.
- The twin-row seeding pattern increased yields for MG III and IV soybean compared to the 97-cm single-row pattern in trial 1. However, narrower row seeding patterns increased yield for the MG IV soybean in trial 2 compared to the twin-row pattern.
- Similar research will be conducted in 2008 to confirm these conclusions.

Trial 1: MG IV soybean; 135 kg ha^{-1}; 97-cm single-row seeding pattern

Trial 1: MG IV soybean;135 kg ha^{-1}; 19-cm twin-row seeding pattern separated by 97-cm

Trial 2: MG IV soybean;146 kg ha^{-1}; 18-cm seeding pattern

Trial 2: MG IV soybean;146 kg ha^{-1}; 38-cm seeding pattern

Trial 2: MG IV soybean;146 kg ha^{-1}; 19-cm twin-row seeding pattern separated by 97-cm

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