Soybean Yield Influenced by Planting Date and Plant Population

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Introduction

Soybean yields tend to increase with rising plant populations. However, soybean yield responses to plant population are generally small and often inconsistent. In general, increasing plant populations increase plant height and result in greater yield losses from lodging. Soybean seed prices have risen tremendously over the last couple of years. My hypothesis is that seed cost can be reduced in replanted fields. The objective of this experiment was to determine the optimum plant population across different planting dates using different tillage systems.

Materials and Methods

Two experiments were conducted using conventional tillage and no-tillage systems. Conventional tillage was accomplished by chisel plowing in the fall and field cultivations twice in the spring before planting. For no-tillage, crops were planted directly into the undisturbed residue of the previous crop. The two experiments were conducted separately and adjacent to each other in a field with corn as the previous crop. Each experiment was a randomized complete block in a split-plot arrangement with four replications. Main plots were planted on April 28, May 11, May 27, and June 10. The subplots consisted of four seeding rates (75,000, 125,000, 175,000, and 225,000 seeds/acre). Plot size of the subplot experimental units was 10 ft × 25 ft. The soybean variety was Dekalb DKB 36-51 RR planted in four rows with 30-in. row spacing at 1.5-in. depth. Plots were harvested October 17 with an Almaco small-plot combine. Grain yields were adjusted to 13% moisture.

Results Discussion

This study did not give us a lot of useful information. The seed had poor germination, which resulted in extremely low stands (Table 1 and Table 2). In addition, the area was hit by drought and spider mites, which resulted in inconsistent yields. In general, the early planting was the lowest yielding because of the drought. Late planting dates were able to take advantage of rainfall in August and were therefore higher yielding. Compared to the no-tillage trials, the conventional tillage trials had decreased yields and increased plant populations.

Conclusion

The inconsistency in this study because of the seed germination, drought stress, and spider mites lead us not to draw any conclusion from this study. The study will not be continued in 2006.

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Table 1. Effect of planting date and final plant population on soybean yield, moisture, height, and lodging in a conventional tillage system.

Main Effect	Yield	Moisture	Height	Lodging
	(bu/acre)	(percent)	(in.)	(1–5)†
Planting Date:				
April 28	42.8	8.9	36.8	1.0
May 11	47.4	9.0	37.6	1.0
May 27	46.8	9.0	39.2	1.0
June 10	45.9	9.0	38.4	1.0
LSD (0.10)	2.4	0.1	1.8	NS‡
Final plant population (P) (plants/acre)				
49,200	49.6	8.9	38.0	1.0
76,800	49.4	8.9	39.6	1.0
114,000	45.1	8.8	39.5	1.0
91,100	38.7	9.2	34.9	1.0
LSD (0.10)	2.4	0.2	1.8	NS
Anova				
L*P	NS	NS	NS	NS

†Lodging score: the range extends from 1=erect to 5=flat.
‡NS, no significant at P≤0.10.

Table 2. Effect of planting date and final plant population on soybean yield, moisture, height, and lodging in a no-tillage system.

Main Effect	Yield	Moisture	Height	Lodging
	(bu/acre)	(percent)	(in.)	(1–5)†
Planting Date:				
April 28	34.2	9.1	35.9	1.0
May 11	40.3	9.0	36.3	1.0
May 27	40.2	8.9	37.9	1.0
June 10	41.5	9.4	34.0	1.0
LSD (0.10)	3.0	0.2	0.8	NS‡
Final plant population (P), plants/acre				
39,000	34.2	9.2	34.4	1.0
71,700	40.3	9.1	36.5	1.0
88,200	40.2	9.1	37.0	1.0
102,900	41.5	9.1	36.0	1.0
LSD (0.10)	3.3	NS	1.4	NS
Anova				
L*P	0.046	NS	NS	NS

†Lodging score: the range extends from 1=erect to 5=flat.
‡NS, no significant at P≤0.10.