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Soybean Yield Influenced by Planting Date and Plant Population

Abstract

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 also 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 we can reduce our seed cost when we need to replant a field. The objective of this experiment was to determine the optimum plant population across different planting dates in northeast Iowa.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

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 also 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 we can reduce our seed cost when we need to replant a field. The objective of this experiment was to determine the optimum plant population across different planting dates in northeast Iowa.

Materials and Methods

The experiment was conducted at the Northeast Research Farm in Nashua. The experiment was a completely randomized block in a split-plot arrangement with four replications. Main plots were planted on April 23, May 6, May 20, and June 4. 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 15 ft × 50 ft whereas 12.5 ft × 45 ft was used for harvest. The soybean variety was NK S24-K4 planted in six rows with 30-in. row spacing at 1.5-in. depth. Plots were harvested October 6 with a small-plot combine. Grain yields were adjusted to 13% moisture.

Results and Discussion

Summarized in Table 1 are the results of the 2004 study. No interactions were observed among treatment effects in this study.

Delaying the planting date from the optimum window (last week of April to the first week of May) decreased soybean yield. Soybean yield increased by raising the seeding rate from 75,000 to 125,000 seeds/acre. However, no difference was found among seeding rates of 125,000, 175,000, or 225,000 seeds/acre. Grain moisture content increased with delayed planting, but no differences in grain moisture content were found among the different plant populations. In general, early planting resulted in taller plants and plant height increased as the plant population increased. Lodging was not influenced by the planting date, and lodging was not consistent across the different plant populations.

Conclusion

It was concluded that both the planting date and plant population influenced grain yield in northeast Iowa in 2004. The study will be continued in 2005.

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Table 1. Effects of planting date and final plant population on soybean yield, moisture, height, and lodging in 2004.

<u>Main Effect</u>	<u>Yield</u> (bu/acre)	<u>Moisture</u> (percent)	<u>Height</u> (in.)	<u>Lodging</u> (1-5)†
<u>Planting date:</u>				
April 23	56.3	10.6	33.2	1.3
May 6	54.9	10.7	34.9	1.3
May 20	49.7	10.8	36.1	1.6
June 4	50.8	11.4	34.6	1.7
LSD (0.10)	2.2	0.3	1.4	NS‡
<u>Final plant population (P), plants/acre</u>				
71,000	51.1	10.9	33.8	1.3
111,300	52.7	10.9	35.0	1.7
150,500	54.1	10.8	35.6	1.3
201,600	54.0	10.9	34.4	1.6
LSD (0.10)	1.6	NS	0.8	0.3
<u>Anova</u>				
L*P	NS	NS	NS	NS

†Lodging score: the range extends from 1=erect to 5=flat.

‡NS, not significant at $P \leq 0.05$.