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Soybean Yield Influenced by Planting Date and Plant Population

Abstract

Soybean yields often increase, up to a point, with increasing plant population. 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 increased tremendously over the last couple of years. Our 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 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 often increase, up to a point, with increasing plant population. 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 increased tremendously over the last couple of years. Our 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 in northeast Iowa.

Materials and Methods

The experiment was conducted at the Northeast Research Farm in Nashua. The experiment was a randomized complete block in a split-plot arrangement with four replications. Main plots were planting date (April 25, May 10, May 21, and June 3). 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 where 12.5 ft × 45 ft was used for harvest. The soybean variety was NK S24-K4 planted in six rows at 30-in. row spacing at 1.5-in. depth. Plots were harvested October 3 with a small-plot combine. Grain yields were adjusted to 13% moisture.

Results and Discussion

Summarized in Table 1 are the results of the 2005 study. An interaction was found between seeding rate and planting date for both yield and height. The interactions were inconsistent and the data will therefore not be presented here. The inconsistency was mainly because the third planting date was planted in marginally wet soils and a crust developed just after planting because of the heavy rainfall.

Delaying the planting date from the optimum window (last week of April and the first week of May) decreased soybean yield. Soybean seed yield didn't respond to plant population as well as other ongoing research in Iowa. Soybean seed yield peaked at a seeding rate of 175,000 seeds/acre, which is higher than what we normally see at other locations where 125,000 seeds/acre is more the average. The reason for this was the poor seedbed conditions at the third planting date.

Conclusion

It was concluded that both planting date and plant population influenced grain yield in northeast Iowa in 2005. The study will not be continued in 2006.

Acknowledgments

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Table 1. Effect of planting date and final plant population on soybean yield, moisture, height, and lodging in 2005.

Main Effect	Yield (bu/acre)	Moisture (percent)	Height (in.)	Lodging (1-5)†
<u>Planting Date:</u>				
April 25	67.8	11.8	36.1	1.7
May 10	68.4	11.8	36.7	2.0
May 21	62.5	11.9	36.2	1.8
June 3	63.7	12.1	39.1	2.2
LSD (0.10)	2.4	0.1	NS‡	NS
<u>Final plant population (P) (plants/acre)</u>				
64,400	62.2	11.8	36.3	1.8
96,900	66.1	11.9	37.9	1.7
136,600	67.9	11.9	37.8	1.7
170,100	66.1	11.9	36.1	2.4
LSD (0.10)	1.4	NS	NS	0.3
<u>Anova</u>				
L*P	NS	NS	NS	NS

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

‡NS, no significant at $P \leq 0.10$.