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Soybean Planting Date and Growth and Development Study

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Soybean Planting Date and Growth and Development Study

Abstract

Soybean planted either the last week of April or the first week of May typically produces yields greater than later planted soybean. This project will determine if initiation and duration of particular growth stages, along with main stem node accumulation explain why early planted soybeans (late April/early May) yield greater than late planted soybeans (mid May). Six planting dates with a one week interval were planted at seven Iowa State University (ISU) research farms and growth stages of the plants from the different planting dates were determined twice weekly.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

Soybean Planting Date and Growth and Development Study

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Introduction

Soybean planted either the last week of April or the first week of May typically produces yields greater than later planted soybean. This project will determine if initiation and duration of particular growth stages, along with main stem node accumulation explain why early planted soybeans (late April/early May) yield greater than late planted soybeans (mid May). Six planting dates with a one week interval were planted at seven Iowa State University (ISU) research farms and growth stages of the plants from the different planting dates were determined twice weekly.

Materials and Methods

The experiment was a randomized complete block design with three replications. Main plots were five planting dates (May 2, May 10, May 16, May 22, and May 29). Plot size was 15 ft × 50 ft, with 25 ft used for biomass sampling and developmental notes and 25 ft was used for harvest. The soybean variety was K201RR/SCN. Seed was treated with an insecticide/fungicide seed treatment, Cruiser Maxx. Each plot was planted in four rows at 30-in. row spacing at a rate of 160,000 seeds/acre and a seeding depth of 1.5 in. Four plants were evaluated to determine growth stage two times a week for 20 weeks until plants reached harvest maturity. The plots were sprayed once during the growing season with Buccaneer to control weeds. They were also

sprayed in late July with Pounce to control aphids. Plots were harvested with an Almaco small-plot combine on October 4. Grain yields were adjusted to 13% moisture. Reported grain yields and other harvest measurements are shown in Table 1. Dates at which plants reached a particular growth stage and the maximum number of main stem nodes are shown in Table 2.

Results and Discussion

Greatest yields were attained with May 2 and May 10 planting dates. Yields decreased significantly as planting was delayed after May 10. Soybean planted on May 10 produced one more main stem node compared with all other planting dates. Time between planting and emergence varied and was inconsistent. Overall, it took 5 to 9 dates from planting to emergence. Plant establishment and final stands varied with the highest final planting population found for the May 22 and May 20 planting dates. Final stand for all planting dates were greater than 100,000 plants/acre. Plants began to flower on June 15 for the May 2 planting date. Flowering was delayed with the delayed plantings. Plants reached harvest maturity 7 days earlier for planting dates that occurred prior to May 10 compared with later dates. This project will continue in 2008 and 2009.

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Table 1. Effect of planting date on soybean plant density, height, lodging, moisture, and yield.

Planting date	Plant density × 1000	Height (in.)	Lodging 1-5†	Moisture (%)	Yield (bu/acre)
May 2	136.0	33.7	1.0	11.5	65.5
May 10	128.0	34.7	1.0	11.3	65.2
May 16	133.3	34.3	1.0	11.4	61.7
May 22	154.5	33.0	1.0	11.5	58.3
May 29	148.3	35.7	1.0	11.7	54.1
LSD (0.10)	14.3	NS¶	NS	0.2	2.6

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

¶NS, not significant at $P \leq 0.10$.

Table 2. Effect of planting date on day of emergence, timing of reproductive state, and maximum main stem node accrual.

Planting date	Emergence	Reproductive stage								Maximum main stem nodes
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	
May 2	May 11	Jun 15	Jun 19	Jul 10	Jul 17	Jul 23	Aug 7	Sep 4	Sep 11	12
May 10	May 15	Jun 19	Jun 22	Jul 10	Jul 23	Jul 23	Aug 10	Sep 4	Sep 11	13
May 16	May 22	Jun 26	Jun 29	Jul 17	Jul 23	Jul 31	Aug 17	Sep 11	Sep 18	12
May 22	Jun 1	Jun 29	Jul 6	Jul 20	Jul 23	Jul 31	Aug 17	Sep 11	Sep 18	12
May 29	Jun 5	Jul 2	Jul 10	Jul 23	Jul 23	Aug 3	Aug 21	Sep 14	Sep 18	12