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Soybean Planting Date and Growth and Development Study

Palle Pedersen
Iowa State University

Jason De Bruin
Iowa State University

Jodee Stuart
Iowa State University

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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 soybean (late April/early May) yield greater than late planted soybean (mid May). Six planting dates with a one week interval were planted at seven Iowa State University (ISU) research stations and growth stages of the plants from the different planting dates were determined twice weekly.

Disciplines
Agricultural Science | Agriculture

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Palle Pedersen, assistant professor
Jason De Bruin, assistant scientist
Jodee Stuart, agricultural specialist

Introduction

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Materials and Methods

The experiment was a randomized complete block design with three replications. Main plots were six planting dates (April 24, May 2, May 9, May 15, May 22, and May 30). Plot size was 5 ft × 50 ft, with 25 ft used for biomass sampling and developmental notes and 25 ft used for harvest. The soybean variety was K201RR/SCN. Seed was treated with an insecticide-fungicide seed treatment, CruiserMaxx. 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 three times during the growing season with Roundup WeatherMAX to control weeds. They were also sprayed in late July with Warrior to control soybean aphids. Plots were harvested with an Almaco small-plot combine on September 23. Grain yields were adjusted to 13% moisture. Reported 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

Maximum yield was attained on the May 9 planting date but yield was statistically similar at the April 24 planting date. Yield continued to decrease as planting was delayed until May 15, 22, and 30. Plant height consistently increased as planting was delayed but did not contribute to greater plant lodging. Planting date did not influence the number of nodes produced on the main stem. Time between planting and emergence increased for early planting dates and was 15 and 13 days for the April 24 and May 2 planting date, respectively, but dropped to less than 10 days for all other planting dates. Plant stands were reduced by April 24 planting, but were still greater than 100,000 plants/acre. Plants began to flower on June 12 for the April 24 planting date but were delayed until July 6 for the May 30 planting date. Time between the R1 and R5 growth stages (seed number determination period) was 13 days longer for the April 24 planting date compared with the May 30 planting date. Plants reached harvest maturity 3 to 5 days earlier for planting dates that occurred prior to May 9. Data collected from this experiment support early planting for achieving maximum soybean yield. Growth changes such as earlier flowering and a longer seed determination period may contribute to greater yields at early planting dates. Studies will be conducted again in 2008.

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

Planting date	Plant density × 1,000	Height (in.)	Lodging 1–5†	Moisture (%)	Yield (bu/acre)
April 24	129.8	30.3	1.0	9.3	67.0
May 2	152.7	33.7	1.0	9.3	66.0
May 9	150.1	34.3	1.0	9.2	68.5
May 15	158.0	36.0	1.0	9.0	64.9
May 22	166.9	38.7	1.0	9.7	65.9
May 30	152.7	39.7	1.0	10.4	58.9
LSD (0.10)	18.6	2.7	NS¶	0.3	2.2

†Lodging score: the range extended 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 stage, and maximum main stem node accrual.

Planting date	Emergence	Reproductive stage								Maximum main stem nodes
		1	2	3	4	5	6	7	8	
Apr 24	May 8	Jun 12	Jun 29	Jul 13	Jul 20	Jul 27	Aug 3	Aug 31	Sep 11	16
May 2	May 15	Jun 15	Jun 29	Jul 17	Jul 20	Jul 27	Aug 3	Sep 4	Sep 11	16
May 9	May 18	Jun 19	Jun 29	Jul 17	Jul 20	Jul 27	Aug 7	Sep 7	Sep 11	16
May 15	May 22	Jun 22	Jul 2	Jul 17	Jul 23	Jul 31	Aug 7	Sep 7	Sep 14	16
May 22	May 29	Jun 29	Jul 10	Jul 20	Jul 27	Aug 3	Aug 14	Sep 14	Sep 18	16
May 30	Jun 5	Jul 6	Jul 17	Jul 23	Jul 31	Aug 7	Aug 21	Sep 18	Sep 21	16