

# 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 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. Growth stages of the plants from the different planting dates were determined twice a week.

## Materials and Methods

The experiment was a randomized complete block design with three replications. Main plots were six planting dates (April 30, May 6, May 13, May 20, May 27, and June 2). Plot size was 5 ft by 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 of 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 two times during the growing season with Roundup WeatherMAX to control weeds. They also were sprayed in early August with Warrior to control soybean aphids. Plots were harvested with an Almaco small-plot combine on September 30. Grain yields were adjusted to 13 percent 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 between April 30 and May 27 but was reduced 6.2 bushels/acre by June 2 planting. One unusual result was 2.8 bushels/acre reduction at the May 13 planting date compared with the two previous dates and the two later dates. Plant height consistently increased as planting was delayed but did not contribute to greater plant lodging. Planting date influenced the number of nodes produced on the main stem very little as early planting increased mainstem node number by less than one node. Time between planting and emergence was greater for early planting dates and was 16 and 15 days for the April 30 and May 6 planting date, respectively, but dropped to less than 11 days for the three latest planting dates. Plants began to flower on June 24 for the April 30 planting date but were delayed until July 11 for the June 2 planting date. Time between the R1 and R5 growth stages (seed number determination period) was only 3 days longer for the April 30 planting date compared with the June 2 planting date. Plants reached harvest maturity 3 to 5 days earlier for planting dates that occurred prior to May 20. Data collected from this experiment support early planting for achieving maximum soybean yield. Studies will be conducted again in 2009.

## Acknowledgements

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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)
April 30	138.1	33.0	1	12.7	65.6
May 6	139.8	34.3	1	12.6	65.5
May 13	153.1	34.0	1	12.5	62.7
May 20	152.2	35.3	1	12.4	63.5
May 27	169.1	36.0	1	12.7	63.8
June 2	150.5	35.7	1	12.8	59.4
LSD (0.10)	14.5	NS‡	NS	NS	2.5

†Lodging score: the range extends 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	
April 30	May 16	Jun 24	Jul 8	Jul 22	Jul 29	Aug 8	Aug 15	Sep 12	Sep 19	16.2
May 6	May 21	Jun 24	Jul 8	Jul 25	Jul 29	Aug 8	Aug 15	Sep 16	Sep 19	16.2
May 13	May 24	Jul 1	Jul 15	Jul 25	Aug 1	Aug 8	Aug 15	Sep 16	Sep 19	15.3
May 20	Jun 1	Jul 4	Jul 18	Jul 29	Aug 5	Aug 12	Aug 26	Sep 19	Sep 23	15.4
May 27	Jun 5	Jul 8	Jul 18	Aug 1	Aug 8	Aug 15	Aug 29	Sep 19	Sep 23	15.1
June 2	Jun 10	Jul 11	Jul 22	Aug 5	Aug 12	Aug 22	Sep 2	Sep 23	Sep 26	15.6