

# Soybean Planting Date and Growth and Development

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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 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 six planting dates (April 18, April 24, May 2, May 9, May 16, and May 23). Plot size was 10 ft × 50 ft, with 25 ft used for biomass sampling and developmental notes and 25 ft used for harvest. The soybean variety was K283RR/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 May 19 and June 21 with Roundup WeatherMAX to control weeds. They were also sprayed August 1 with Mustang Max to control soybean aphids. Plots were harvested with an Almaco small-plot combine on September 27. 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

Yields of the April 18, 24, and May 2 planting dates were 7 bushels/acre more than the May 9 or later planting dates. Lowest yields were attained at the May 16 and 23 planting dates. Plants were shorter when planted on April 18 but greater plant height for later planting dates did not contribute to greater plant lodging. Soybeans planted on April 18, 24, and May 1 produced one more main stem node compared with May 9 planting and two more than the last two dates. Time between planting and emergence was 13 days for the April 18 planting date but dropped to less than 10 days for all other planting dates. Delayed emergence with April 18 did influence plant establishment and final stands were less than 100,000 plants/acre. Plants began to flower on June 5 for the April 18 planting date, but were delayed until June 29 for the May 23 planting date. Time between the R1 and R5 growth stages (seed number determination period) was 10 days longer for the April 18 planting date compared with the May 22 planting date. Plants reached harvest maturity 3 to 5 days earlier for planting dates that occurred prior to May 12. Data collected from this experiment support early planting for achieving maximum soybean yield. Growth changes such as earlier flowering, longer seed determination period, and more main stem nodes may all contribute to greater yields at early planting 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<br>× 1,000 | Height<br>(in.) | Lodging<br>1–5† | Moisture<br>(%) | Yield<br>(bushels/acre) |
|---------------|--------------------------|-----------------|-----------------|-----------------|-------------------------|
| April 18      | 92.7                     | 38.7            | 1.0             | 13.0            | 82.2                    |
| April 24      | 122.7                    | 41.0            | 1.0             | 12.7            | 84.8                    |
| May 2         | 129.8                    | 44.3            | 1.0             | 12.7            | 85.1                    |
| May 9         | 130.7                    | 43.7            | 1.0             | 12.6            | 77.2                    |
| May 16        | 127.1                    | 41.7            | 1.0             | 12.5            | 73.0                    |
| May 23        | 134.2                    | 42.0            | 1.0             | 12.9            | 64.0                    |
| LSD (0.10)    | 20.6                     | 3.2             | NS¶             | NS              | 8.2                     |

†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<br>date | Emergence | Reproductive stage |        |        |        |        |        |        |        | Maximum<br>main stem<br>nodes |
|------------------|-----------|--------------------|--------|--------|--------|--------|--------|--------|--------|-------------------------------|
|                  |           | 1                  | 2      | 3      | 4      | 5      | 6      | 7      | 8      |                               |
| Apr 18           | May 1     | Jun 5              | Jun 12 | Jun 22 | Jul 6  | Jul 17 | Jul 27 | Aug 28 | Sep 7  | 20                            |
| Apr 24           | May 4     | Jun 5              | Jun 15 | Jun 26 | Jul 13 | Jul 20 | Aug 7  | Sep 4  | Sep 11 | 20                            |
| May 2            | May 11    | Jun 8              | Jun 15 | Jun 26 | Jul 17 | Jul 27 | Aug 10 | Sep 4  | Sep 11 | 20                            |
| May 9            | May 15    | Jun 15             | Jun 22 | Jul 10 | Jul 23 | Jul 27 | Aug 14 | Sep 7  | Sep 14 | 19                            |
| May 16           | May 25    | Jun 19             | Jul 6  | Jul 20 | Jul 23 | Jul 31 | Aug 24 | Sep 11 | Sep 18 | 18                            |
| May 23           | Jun 1     | Jun 29             | Jul 10 | Jul 20 | Jul 27 | Jul 31 | Aug 28 | Sep 14 | Sep 18 | 18                            |