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Soybean Planting Date and Growth and Development

Palle Pedersen
Iowa State University

Jason De Bruin
Iowa State University

Jodee Stuart
Iowa State University

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Soybean Planting Date and Growth and Development

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 | Agronomy and Crop Sciences

Soybean Planting Date and Growth and Development

Palle Pedersen, assistant professor
Jason De Bruin, assistant scientist
Jodee Stuart, ag specialist
Department of Agronomy

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 28, May 3, May 11, May 16, May 22, and May 30). 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 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 May 31 and June 28 with Roundup WeatherMAX to control weeds. They were also sprayed July 13 with Warrior to control soybean aphids. Plots were harvested with an Almaco small-plot combine on September 22 and October 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

Greatest yields were attained with the May 16 and May 22 planting dates. Yields of May 3 and 11 planting dates were slightly less and yields on either April 28 or May 30 were lower. Soybeans planted on April 28 and May 3 and 11 produced one more main stem node compared with all other planting dates. Time between planting and emergence was 10 and 12 days for the April 28 and May 3 planting date but dropped to less than 10 days for all other planting dates. Plant establishment and final stands were similar for all planting dates and were greater than 100,000 plants/acre. Plants began to flower on June 15 for the April 28 and May 3 planting dates 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 only 4 days longer for the April 28 planting date compared with the May 30 planting date. Plants reached harvest maturity 4 to 11 days earlier for planting dates that occurred prior to May 11 compared with later dates. Data collected from this experiment were not expected based on other data that supports early planting for achieving maximum soybean yield. Growth changes such as earlier flowering, longer seed determination period, and more main stem nodes did not explain the planting date response. This project will continue in 2008 and 2009.

Acknowledgements

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 (bushels/acre)
Apr 28	144.8	29.0	1.0	9.9	52.8
May 3	132.4	28.7	1.0	9.8	58.1
May 11	152.7	30.7	1.0	9.7	58.8
May 16	155.4	33.0	1.0	10.4	64.5
May 22	156.3	33.0	1.0	12.4	60.6
May 30	150.1	34.7	1.0	12.2	52.4
LSD (0.10)	NS¶	3.3	NS	0.8	4.9

†Lodging score: the range extended from 1 = erect to 5 = flat.
¶NS = not significant at P ≤ 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 28	May 8	Jun 15	Jun 22	Jul 2	Jul 6	Jul 17	Aug 7	Aug 31	Sep 11	14
May 3	May 15	Jun 15	Jun 26	Jul 6	Jul 13	Jul 20	Aug 7	Sep 4	Sep 11	14
May 11	May 18	Jun 22	Jul 2	Jul 10	Jul 17	Jul 27	Aug 14	Sep 7	Sep 14	14
May 16	May 25	Jun 26	Jul 2	Jul 17	Jul 23	Jul 27	Aug 17	Sep 14	Sep 18	13
May 22	May 29	Jun 29	Jul 6	Jul 20	Jul 23	Aug 3	Aug 21	Sep 18	Sep 21	12
May 30	June 8	Jul 6	Jul 10	Jul 27	Jul 31	Aug 3	Aug 31	Sep 18	Sep 25	13