

## *Benefits and Risks of an Early Planted Soybean Crop*

- University research studies have supported early soybean planting; however, there are risks associated with early planting.
- Risk mitigation includes soybean product selection, a weed-free field, seed treatment considerations, adequate stand establishment, and other agronomic considerations.
- Consider using seed treated with an insecticide for bean leaf beetle (BLB) protection and with fungicides to protect seedlings from soil-borne pathogens.

Planting soybeans early can help maximize yield potential, despite cold soil temperatures and slow seedling growth. Although the ideal soil temperature for rapid soybean germination and emergence is between 77° and 86°F, soybean seeds can germinate when the soil temperature is about 50°F. However, at cooler soil temperatures, soybean emergence may take as long as two to three weeks.

When planting early, it is important to mitigate risk and plant into good soil and well-conditioned seedbeds. Planting when soil is too wet can result in soil compaction, poor seed placement, and poor stand establishment. Excessive tillage or heavy precipitation soon after planting can result in soil crusting, which can limit emergence. Planting into wet soils may negate any yield potential advantage of planting early.

### **Early Planting Date University Research Studies**

- Data collected from the **Michigan** Soybean Yield Contest showed that the average planting date for high-yield producers was May 4, 13 days earlier than the low-yield producers.<sup>1</sup> In addition, the high-yield producers averaged 10 more pods per plant than the low-yield groups, due to plants developing more nodes on the main stem.<sup>1</sup>
- In **Nebraska**, studies showed average yield losses of 0.25 bu/acre in poor growing conditions and losses of 0.6 bu/acre under good growing conditions for each day soybean planting was delayed after May 1.<sup>1</sup>
- **Iowa** State University found that most farmers can increase yield by 3 to 4 bu/acre by planting soybean beginning April 25th in southern regions and May 1st in northern regions of Iowa.<sup>2</sup>
- **Minnesota** trial results indicated that maximum soybean yield was obtained when the planting date occurred between May 1 through 15.<sup>3</sup>
- **North Dakota** research showed that late plantings resulted in lower soybean yields, seed quality, and seed oil content, as well as shorter plants. In addition, seeds were set lower to the ground in late plantings compared to those planted on the optimum planting date, which was no sooner than five days before the average last killing frost in the spring.<sup>4</sup>
- A research trial in **Illinois** found that soybean yields were higher when seeds were planted between late April and early May, due to more pods per unit area.<sup>5</sup>

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## Benefits of Planting Soybean Seed Early

A larger canopy, earlier in the growing season can help **conserve soil moisture** during the reproductive periods. The absorption of solar radiation can be increased leading to **higher rates of photosynthesis**. Canopy closure helps **reduce weed competition** early in the season and may prevent later emerging weeds from becoming a problem.

A longer growing season at the reproductive growth stages can **increase the number of nodes** on the main stem, leading to more flowers, pods, and seeds. Depending on conditions, flowering and harvesting may be earlier.

## Managing Risks Associated with Planting Soybean Seed Early

**Stand establishment.** Heavy crop residue can prevent soil warming. Tillage may be necessary to reduce residue, but only when soils are dry enough to minimize soil compaction. Adequate soil drainage can help promote root development. Maintain adequate fertility and calibrate planting equipment for accurate planting depth and seeding rate. Always refer to the manufacturer's manual before performing any maintenance.<sup>6,7</sup>

**Early frost damage.** Imbibitional chilling and frost damage can occur with extended cool and wet soil conditions. Avoid planting into wet soils, and plant into a well-prepared seedbed.

**Early season pests.** Cold soil temperatures can slow root development, making soybean stands more susceptible to overwintering bean leaf beetles (BLB) (Figure 1) and root-rotting seedling pathogens such as *Phytophthora*, *Pythium*, *Rhizoctonia*, and *Fusarium*.

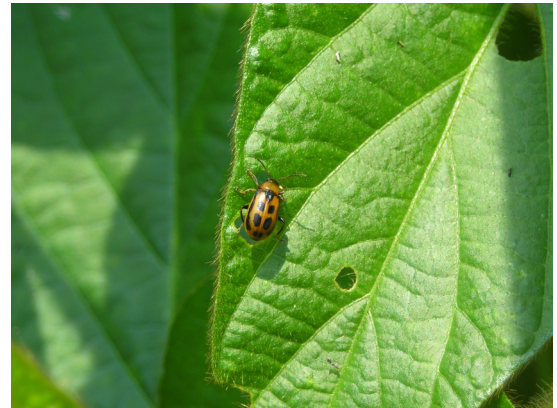


Figure 1. Bean Leaf Beetle

Insecticide seed treatments can help provide protection against BLB. Monitor fields regularly for damage due to BLB. In addition to germplasm selection and good soil drainage, most fungicide seed treatments can help provide protection against diseases. Continue to scout fields for diseases such as frogeye leaf spot and white mold (Figure 2). A larger canopy earlier in the season can provide a favorable environment for diseases.



Figure 2. Frogeye leaf spot (left), white mold (right) symptoms on soybean plants.

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**Sudden death syndrome (SDS)** is a disease associated with cool and saturated soil conditions, which are common in an early growing season. Selecting a soybean product with SDS tolerance may help reduce the risk of SDS infection early in the season and development later in the season (Figure 3). Soybean products that are resistant to soybean cyst nematodes (SCN) (Figure 4) can also help, since the presence of SCN has been associated with increased SDS incidence.



*Figure 3. SDS symptoms with interveinal yellowing and necrotic spots.*



*Figure 4. SCN symptoms on soybean roots.*

## Summary

Soybean yield potential is often affected by planting date. University research results have shown that early planting can help maximize soybean yield potential. The potential yield benefits can be achieved by managing risks to early planting with improved technologies and tools.

## Sources

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- <sup>2</sup> Licht, M. A., D. Wright, and A. W. Lenssen. 2013. Planting soybean for high yield in Iowa. Agriculture and Environment Extension Publications. 193. [https://lib.dr.iastate.edu/extension\\_ag\\_pubs/193](https://lib.dr.iastate.edu/extension_ag_pubs/193).
- <sup>3</sup> Naeve, S. L. 2018. When and how to plant soybean. University of Minnesota. <https://extension.umn.edu/soybean-planting/when-and-how-plant-soybean#:~:text=The%20standard%20University%20of%20Minnesota,their%20maturities%20until%20late%2DJune>.
- <sup>4</sup> Kandel, H. and G. Endres. 2019. Soybean production field guide for North Dakota. <https://www.ag.ndsu.edu/publications/crops/soybean-production-field-guide-for-north-dakota#section-12>.
- <sup>5</sup> Roozeboom, K. 2012. Soybean planting dates: Is earlier a good idea? AG Professional. <https://www.agprofessional.com/article/soybean-planting-dates-earlier-good-idea>.
- <sup>6</sup> Pocock, J. 2010. 7 ways to attain ultra-high soybean yields. FarmProgress. <https://www.farmprogress.com/soybeans/7-ways-attain-ultra-high-soybean-yields>.
- <sup>7</sup> Specht, J. 2010. Three reasons why soybean planting date matters. CropWatch. University of Nebraska-Lincoln. <https://cropwatch.unl.edu/why-soybean-planting-date-matters>.
- <sup>8</sup> Nafziger, E. 2020. Planting corn and soybeans in 2020. Farmdoc daily 10:67, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign. <https://farmdocdaily.illinois.edu/2020/04/planting-corn-and-soybeans-in-2020.html>.

Web sources verified 10/14/20.

## Legal Statement

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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