

## Correlation of Soybean Yield to Planting Date

Soybean planting date often impacts yield potential. However, with 2008 and 2009 planting delays as recent reminders, soybean planting date is not always in our control. We can examine planting date data and try to make an informed decision on planting date for soybeans in order to maximize yield potential. Examining yield data from several universities suggests planting soybeans “early,” in late April or early May, can help maximize yield potential. While there are risks, the potential yield benefits for early planting are compelling and tools are available to help mitigate most risks.

### Yield of Early vs. Late Planting Date

Research from several Midwestern universities lends support to early planting of soybean, when field conditions are suitable.

**Illinois.** Results from the University of Illinois’ higher yielding environments at DeKalb (northern IL) and Monmouth (west central IL) indicated an incremental yield loss for planting dates beyond May 1 (Table 1).<sup>1</sup> A similar response to delayed planting was also observed in lower yielding environments. Results indicate that planting in late April and early May is favorable for maximizing yield potential.

**Iowa.** The optimal planting date for soybean in the southern 2/3 of Iowa is during the last week of April, and the first week of May for the northern 1/3 of Iowa, if soil conditions are suitable.<sup>2</sup>

Research by Iowa State University indicated that 79% of the time, planting in late April or early May resulted in higher yields than planting around May 20th. A model based on this data indicated a considerably larger yield increase from early-planting in high yield environments.

**Table 1. Yield loss in bushels per day of delayed planting in IL.**

Planting Date	Yield Loss (bu/A per day)
May 1-10	0.10
May 11-20	0.23
May 21-30	0.36
June 1-10	0.54

Source: Adapted from V. Davis and E. Nafziger. *The Bulletin*. No. 6 Article 9/May 1, 2009. <http://ipm.illinois.edu>

**Indiana.** Data from Purdue indicated that planting in April or early May allowed for higher soybean yields in Indiana.<sup>3</sup> Data also suggested that the increased yield potential from early planting is likely due to more reproductive nodes per plant and more pods per node. Comparatively, delaying planting until late May or early June significantly reduced yield.

**Minnesota.** Although the definition of “early planting” is redefined in Minnesota compared to the “I states”, the early planting date trends still exist (Table 2). Trial results indicate maximum soybean yield is obtained when planting between May 1 – 15.<sup>4</sup> Yield results from Crookston in 2007 and 2008 showed insignificant yield loss at an April 25 planting date compared to May and early June planting dates; thus, lending support to early planting.

**Kentucky.** Research is currently being conducted at the University of Kentucky to determine if April

**Table 2. Percent yield loss at various planting dates for soybean in MN.**

Planting Date	Percent Yield Loss
May 10	0
May 20	3
May 30	9
June 10	18
June 20	30
June 30	43

Source: Adapted from P. Glogoza. 2009. *Soybean Planting Date and Delayed Planting*. Minnesota Crop News. June 11, 2009.

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plantings achieve maximum yield potential. Several planting date studies conducted in Kentucky over several years show a 0.5 - 1 bu/A yield loss can be expected when planting is delayed past June 10 - 15.<sup>5</sup>

## Early Planting: Benefits vs. Risks

The potential benefit of yield gain when planting soybean early needs to be weighed with the potential risks. When planting early, delayed emergence may occur given the cooler soil temperatures. Although the ideal soil temperature for soybean is 77 °F, soybean can germinate when the soil temperature is about 50 °F at 2 inches. Emergence may take as long as 3 weeks at this temperature. During this time of delayed emergence, soybeans are dormant and can be vulnerable to diseases and insects. Several tools are available to help manage the risks of early planting (Table 3).

Cold soil temperatures slow root development and make the stand more susceptible to root rotting pathogens. If there is a field history of seedling diseases from Pythium, Phytophthora, Rhizoctonia, or Fusarium, fungicide seed treatment is recommended.

Early planting may predispose soybean plants to infection by the sudden death syndrome (SDS) fungus. Selecting soybean varieties with SDS tolerance and planting fields with no history of SDS first are management options to reduce the risk of SDS infection and development later in the season.

While not always a concern with early planting, high populations of bean leaf beetles (BLB) can be a risk for newly emerged soybeans. In fields with a history of high BLB populations, insecticide seed treatments or foliar



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**Table 3. Risks associated with early planting and available management tools.**

Risk	Management Tools
Seedling diseases such as Pythium, Phytophthora, Rhizoctonia, and Fusarium	Fungicide seed treatments; germplasm selection; drainage
Sudden Death Syndrome (SDS)	Germplasm selection
1st generation Bean Leaf Beetles	Insecticide seed treatments; foliar applied insecticide
Frost	none

applied insecticide treatments are effective management options.

**In Summary**, planting into a suitable seedbed can require patience, especially if the goal is to plant early. The potential yield benefits of early planting can be realized by managing the early season risks.

Sources: <sup>1</sup>V. Davis and E. Nafziger. April Showers Bring May . . . Planted Soybeans, We Hope! The Bulletin. No. 6 Article 9/May 1, 2009. <http://ipm.illinois.edu> (3/4/10)

<sup>2</sup>P. Pedersen. Soybean Planting Date fact sheet. IA State Univ. Ext. <http://extension.agron.iastate.edu> (3/4/10)

<sup>3</sup>A. Robinson, et.al. 2009. Analysis of High Yielding, Early-Planted Soybean in Indiana. Agronomy Journal. Vol. 101:131-139. Published online 8 Jan 2009. <http://agron.scijournals.org> (3/4/10)

<sup>4</sup>P. Glogoza. 2009. Soybean Planting Date and Delayed Planting. Minnesota Crop News. June 11, 2009. <http://blog.lib.umn.edu> (3/5/10)

<sup>5</sup>J. Herbek and M. Bitzer. AGR-130: Soybean Production in Kentucky Part III: Planting Practices and Double Cropping. Univ of Kentucky Extension. <http://www.ca.uky.edu> (3/5/10)