



Effects of Soybean Planting Date on Yield

Trial Objective

- By delaying soybean planting, the yield potential of the crop is decreased. University of Illinois data indicates that maximum soybean yield potential is achieved at a planting date of April 17, based on nine years of research from 2008-2016.4
- Cold soil temperatures, common in early planting situations, can delay germination, increasing the risk of the seeds being damaged by insects, nematodes, and soil-borne pathogens, and limiting the potential benefit of an extended growing season.
- This 2018 research study was conducted with the goal of further understanding and quantifying the yield impact of different planting dates in soybean.

Research Site Details

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (bu/acre)	Seeding Rate (seeds/acre)
Roanoke, IL	Silt loam	Corn	Conventional	4/25/18, 5/8/18, 5/23/18	9/24/18, 10/4/18	75	140K
Auburn, IL	Silt loam	Corn	Conventional	5/2/18, 5/22/18	9/29/18	75	140K
Monticello, IL	Silt loam	Corn	Conventional	5/1/18, 5/14/18, 6/1/18	10/23/18	75	140K

- This trial was conducted at Bayer Market Development sites in Sangamon, Piatt, and Woodford Counties, Illinois.
- An identical set of soybean products was planted early (prior to May 5), normal (May 5 through May 20), and late (after May 20) at each location except at the Auburn location where unfavorable weather prevented the latest planting.
- All planting dates were planted at a seeding rate of 140,000 seeds/acre and were harvested as they matured.
- All seed used in this study was treated with Acceleron® Seed Applied Solutions STANDARD seed treatment.
- The number of nodes per plant were counted at harvest for each product and planting date.
- The 2018 growing season began favorably, with higher than normal temperatures and adequate precipitation early. Very little rainfall accumulated in July and early August before normal rainfall resumed.

Understanding the Results

- In this study, the earlier planting dates out-yielded the later planting dates (Figure 1). This trend was consistent across relative maturities and locations.
- At the early and normal planting dates, there was not a significant difference in the number of nodes per plant (Figure 2). However, there were significantly fewer nodes on later-planted soybean plants. This helps to explain some, but not all, of the yield differences observed.
- These results are consistent with data from multiple universities and grower experience, which suggest that there is a potential yield gain from planting soybean crops earlier than historical norms.



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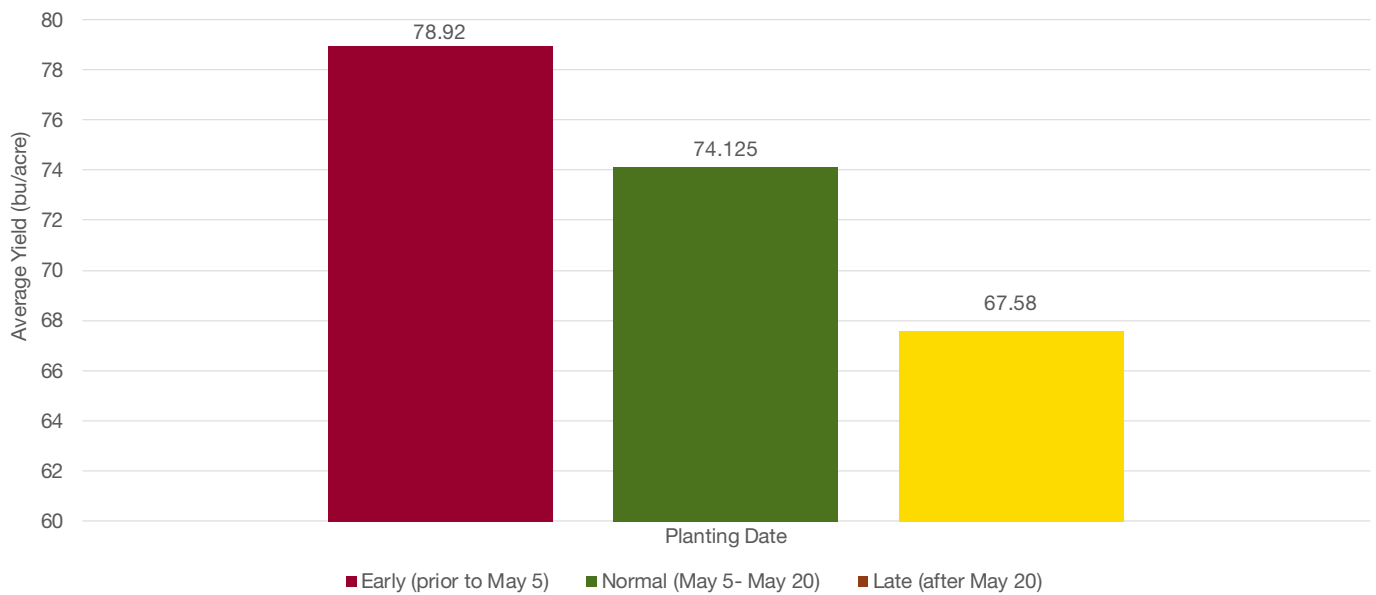


Figure 1. Average yield by soybean planting date.

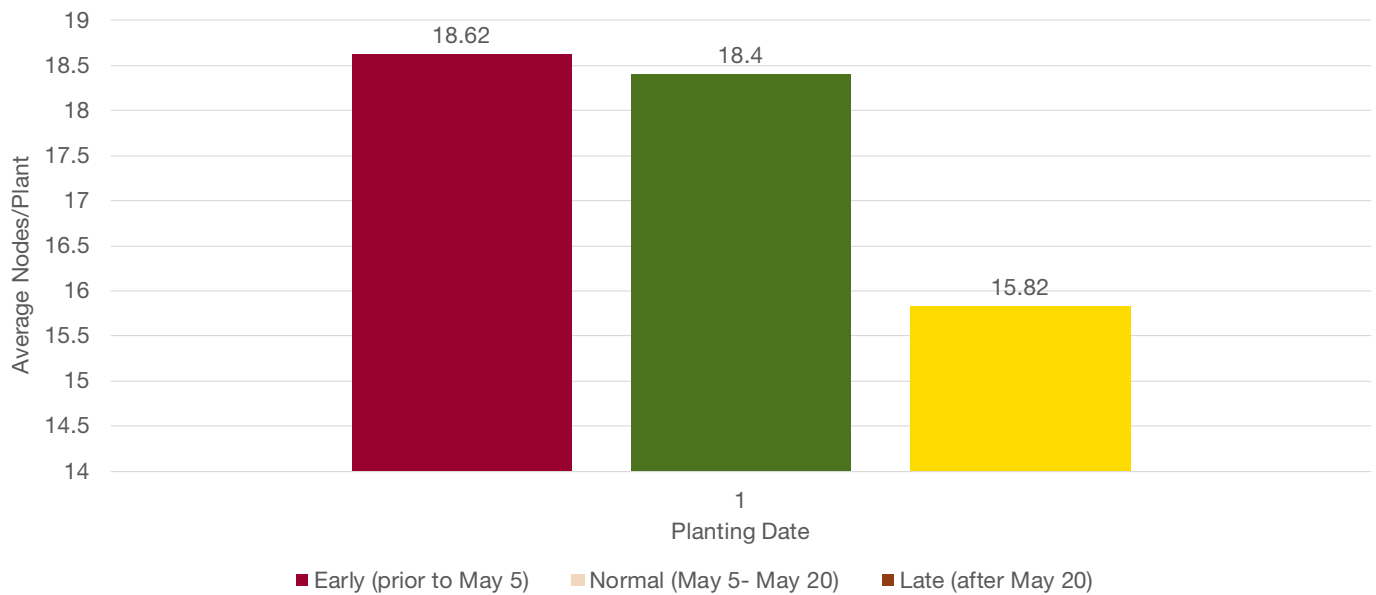


Figure 2. Average nodes per plant by soybean planting date.

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What Does This Mean for Your Farm?

- According to USDA statistics, the percentage of the soybean crop planted by the first week of May has increased from around 9% in 1982 to 16% in 2017.¹ Planting early allows more nodes to accumulate throughout the growing season. Increased node count is highly correlated with increased yield; node count is the physical trait that has the single highest effect on yield.² University of Nebraska research indicates that nodes are consistently created at a rate of 0.27 nodes/day, regardless of weather conditions.³ Node accrual continues until the R5 growth stage. Therefore, for each week earlier the crop is in the ground, approximately two additional nodes are generated. The onset of the R5 growth stage is hastened by late-season stress, increasing the importance of early-season node creation.
- To help maximize soybean yield potential, growers should utilize solid agronomic insight when assessing soybean planting dates. In general, the University of Illinois does not recommend planting soybean seeds at soil temperatures below 50° F.⁵ The most common loss of soybean stand after planting is heavy rainfall between planting and emergence; therefore, the long-term weather forecast should be considered since early-planted soybean seeds can take longer to emerge.⁴

Sources

¹USDA National Agricultural Statistics Service. www.nass.usda.gov/Agcensus

²Ball, R.A., McNew, R.W., Vories, E.D., Keisling, T.C., and Purcell, L.C. 2001. Path analyses of population density effects on short-season soybean yield. *Agronomy Journal*. Volume 93.

³Bastidas, A.M., Setiyono, T.D., Dobermann, A., Cassman, K.G., Elmore, R.W., Graef, G.L. and Specht, J.E. 2008. Soybean sowing date: The vegetative, reproductive, and agronomic impacts. *Crop Science*. Volume 48.

⁴Nafziger, E. 2016. Planting date: Corn or soybean first? The bulletin: Pest management and crop development information for Illinois. <http://bulletin.ipm.illinois.edu/?p=3564>

⁵De Bruin, J.L. and Pedersen, P. 2008. Soybean seed yield response to planting date and seeding rate in the upper Midwest. *Agronomy Journal*. Volume 100.

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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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