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E. Adee
Kansas State University, eadee@ksu.edu

S. Dooley
Kansas State University, sjdooley@k-state.edu

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Effect of Early Planting on Soybean Yield

E. Adee and S. Dooley

Summary

In an effort to increase soybean yield potential, early planting dates have been promoted as a management practice that can increase soybean yields. Early planting of soybeans can be a relative term, meaning late April/early May for some soybean producers in Kansas. For the purpose of this study, the definition of early planted soybeans is late March/early April. Theoretically, the earlier planting date could allow for more vegetative growth and absorption of more light before blooming, increasing the yield potential. With the improvement of soybean seed treatments to protect seed when emergence is slowed due to cool and wet conditions, the early planting may be a viable option. The planting dates were late March, mid-late April, and May. One of the variety/population treatments planted early yielded 6 bu/a better than the next highest yield at the mid-April planting date at Topeka. None of the other variety/population combinations yielded higher than the mid-late April planting dates at either location.

Procedures

In 2021, early soybean planting studies were conducted at two Kansas State University Experiment fields, the Kansas River Valley (Topeka) and North Central (Scandia). The experiment at Topeka was irrigated, receiving 3.2 inches of water from August 2 to September 8. The experiment at Scandia was dryland. Two varieties were planted at two seeding rates (100,000 and 150,000 seeds/a) at each of three planting dates in both studies. The varieties at Topeka were Asgrow AG37XF1 (Maturity Group 3.7) and AG40XF0 (MG 4.0) treated with Acceleron + ILeVO, and at Scandia were Golden Harvest GH3442XF (MG 3.4) and GH4452XF (MG 4.4) treated with Cruisermaxx + Vibrance + Saltro. The planting dates at Topeka were March 30, April 15, and May 4. The Scandia planting dates were March 31, April 27, and May 24. Soybeans were planted in four 30-inch row plots (10 ft wide) × 30 to 40 feet long. The experiment at Topeka utilized a randomized complete block design with four replications, and at Scandia, the variety and seeding rate treatments were randomized within each planting date block. Yields were determined from the middle two rows of each plot to avoid influence from neighboring plots. Yields were corrected to 13% grain moisture. Weed control was managed to have no effect on yields.

Results

The soil conditions were good for planting in Topeka during late March, but 3 inches of snow fell on April 20 as the first planting date was starting to crack through. Seedlings of the first planting date at Topeka emerged by April 27. In spite of taking nearly a month to emerge there were no large gaps in the stand. At Scandia, there was no snow recorded on April 20, but the temperatures dropped to 25°F. Seedlings of the first planting date started to emerge April 19, with full emergence by May 7.

The highest yield of 80 bu/a was with the shorter season variety planted March 30 at 150,000 seeds/a at Topeka, and the lowest yield was with the shorter season variety planted May 4 at 100,000 seeds/a (Figure 1). Yields of any of the variety/seeding rate/planting date combinations showed no significant difference between the high and low yielding treatments.

At Scandia, there was little yield response to planting date (Figure 2). There was no yield advantage for planting any of the variety/seeding rate treatments in late March (Figure 2). Generally, the highest yields were with the April 27 planting date, although the high population, shorter MG variety yielded higher at the May 24 planting date.

While caution should be used in making conclusions from this limited data set, it was shown that there can be a very positive yield response to planting soybeans in late March/early April for certain variety/seeding rate combinations. For most variety/seeding rate treatments, there was no major yield loss due to early planting. Further research is needed to determine if these trends for yield response are consistent. An additional study could be to identify the varieties that respond with increased yield due to the early planting date more consistently than other varieties.

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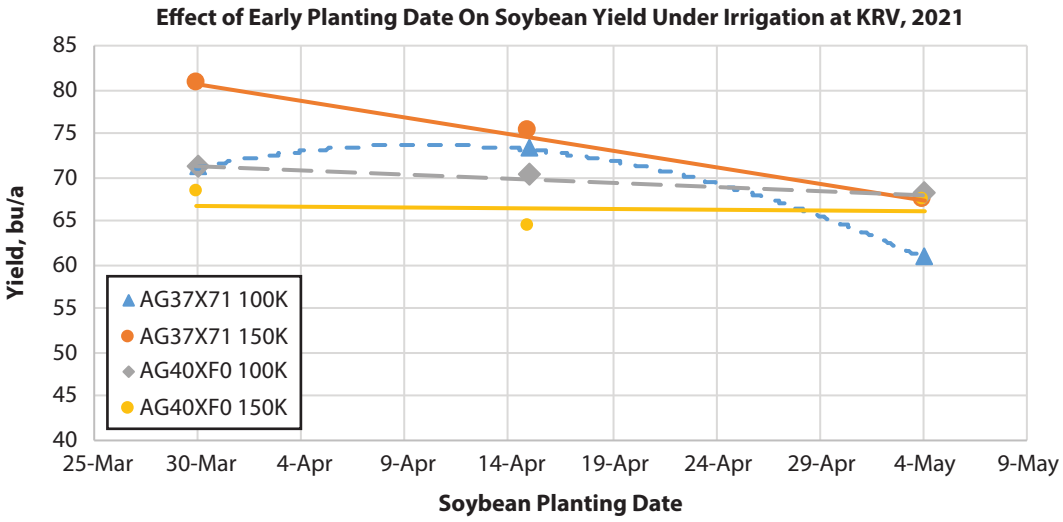

Figure 1. Effect of soybean planting date with soybean varieties of different maturity groups, planted at two seeding rates, on yield at Kansas River Valley Experiment Field, Topeka, 2021.

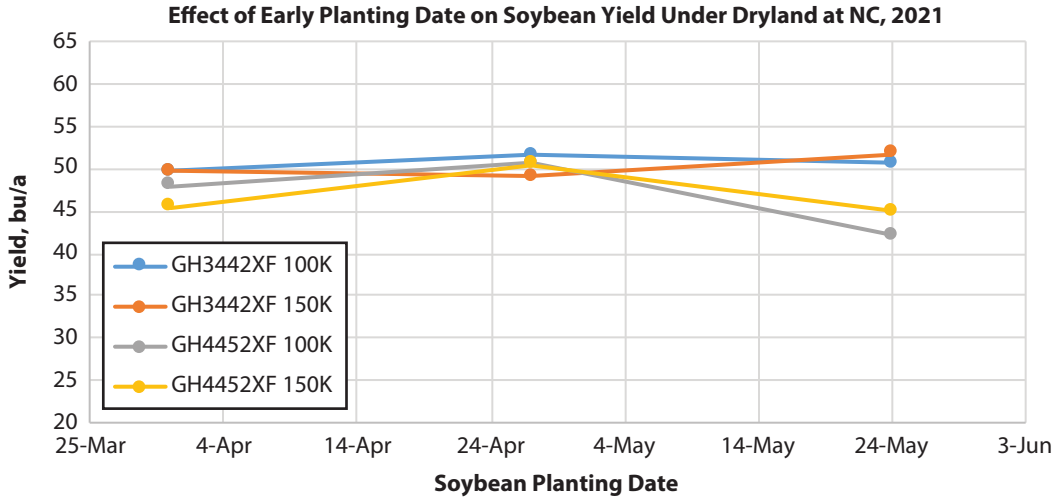

Figure 2. Effect of soybean planting date with soybean varieties of different maturity groups, planted at two seeding rates, on yield at North Central Experiment Field, Scandia, 2021.