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Soybean Production: Planting Date × Variety, Southeast Kansas

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Summary

Optimal soybean planting in southeast Kansas usually occurs from mid-May to mid-June for full-season or late June to early July for double-cropped soybean. Planting is timed to capture fall rains and cooler temperatures during critical periods of bean development and yield formation to avoid midsummer heat and drought.

Introduction

Advances in soybean breeding programs have developed cultivars for improved productivity. The optimal planting times for these cultivars under the varying soils and environmental conditions across the state of Kansas is not known. This study is part of a larger study examining optimal planting dates for modern soybean varieties from various maturity groups.

Conventional production practices in southeast Kansas time soybean planting to match the high-water demanding reproductive period with fall rains, avoiding dry periods common during the summer. This later spring planting works best for longer maturity groups; however, late harvest can be delayed even further by cooler temperatures and wet soils in the fall. Researchers in other parts of the United States have shown an earlier planting system for soybean can improve yields by increasing the vegetative growth period and forming more nodes where soybean pods can develop (Heatherly et al., 1998). This study explores the impact of planting date on yield for new soybean cultivars across a range of maturity groups.

Experimental Procedures

Soybean cultivars from maturity groups 3.9, 4.8, and 5.6 were planted at three times during the 2014 growing season. The cultivars 'AG3934,' 'AG4831,' and 'AG5632' were planted on May 3, June 2, and June 26, respectively, on a Parsons silt loam soil. All treatments were replicated 4 times. Conventional agronomic practices were followed to ensure optimal production. Total yield from each cultivar and planting date was determined by harvesting the center rows of each plot at maturity using a plot combine.

Results and Discussion

The trend in soybean yield indicated the earlier maturity group (MG or relative maturity RM) (3.9) yielded highest at the earliest planting date (May 3), 49 bu/a (Figure 1).

This earlier maturing variety planted relatively early likely benefited from a wetter and cooler than normal June, with most yield being determined prior to periods of heat and drought during August. Yield declined for this maturity group at later planting because flowering and pod set occurred later in the season during a period of heat and drought (26 bu/a planted on June 2 and 37 bu/a planted on June 26) (Figure 1).

Unlike the earlier maturing variety, the longer-maturing cultivars (both 4.8 and 5.6 MG) yielded better at the later planting dates (yields above 45 bu/a). Improved yields with later plantings are likely due to a shift in flowering and pod set in the cooler and wetter conditions of September. Similar yields were observed for both later maturing varieties with both June plantings (both near 51 bu/a). The early May planting of the 4.8 and 5.6 MG soybean varieties put timing of flowering and pod set during the hot and dry periods of the summer, and yields were affected (38 and 41 bu/a, respectively) (Figure 1).

Although a trend in the data supported timing of planting to capture fall rains to enhance yield, the results were not statistically significant between the later maturity groups.

Reference

Heatherly, L.G., and G. Bowers, eds. 1998. Early Soybean Production System Handbook. USB 6009-091998-11000. Agricultural Communications, Mississippi State University. Available at: http://unitedsoybean.org/wp-content/uploads/ESPS_Handbook_19984.pdf

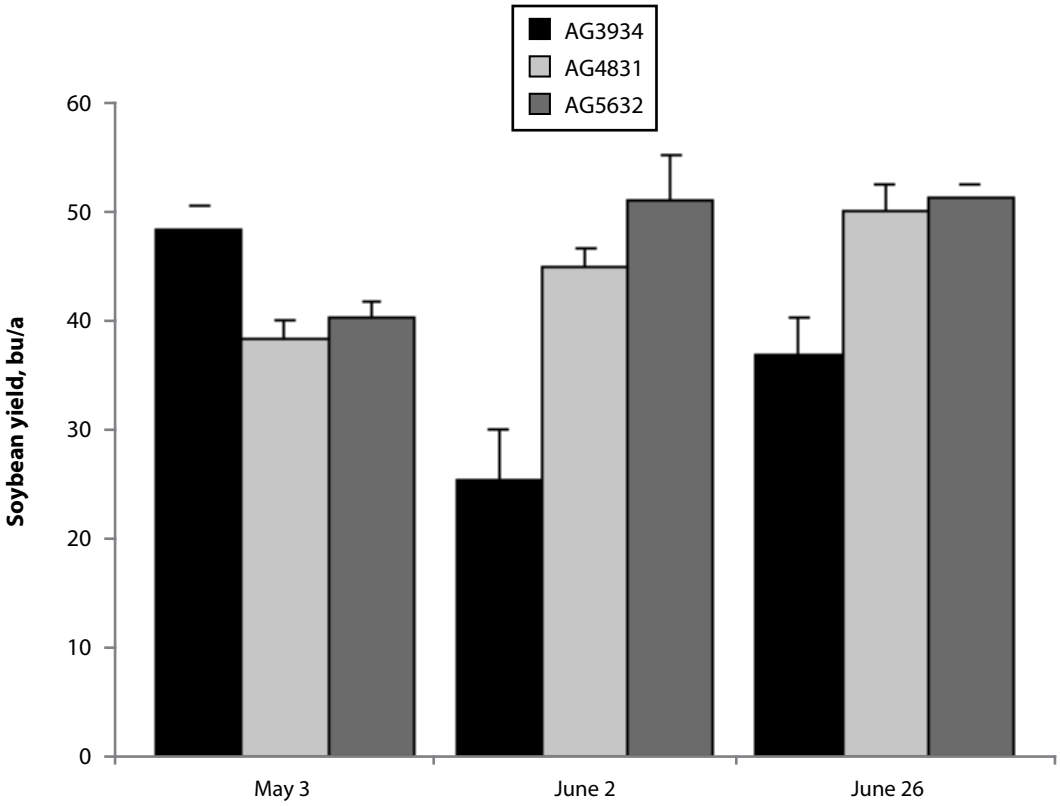

Figure 1. Soybean yield (bu/a) related to the planting date (early = May 3, optimal = June 2, and late = June 26) by maturity group (3.9, 4.8, and 5.6 maturity group) interaction for southeast Kansas area, Parsons location.