

Evaluating Earlier Planting Dates for Increased Soybean Yields

Final Report to Maryland Soybean Board

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Project Objectives

To 1) plant full season soybeans at three different dates, 2) evaluate soybeans for nutrient deficiencies, disorders, or pest pressure, and 3) compare tissue and soil samples to yield after harvest.

Progress of Work

In 2022, we modified the 2021 protocol to 1) duplicate the soybean variety trials at an earlier planting date at two locations (Clarksville and Wye) and 2) evaluate three planting dates for one variety selected by Dr. Jarrod Miller at three locations in MD (Keedysville, Clarksville, Wye), with soil and tissue samples collected per plot as close to R1 growth stage as possible. This was a paired evaluation with UDeI in its third and final year. In general, we hypothesized that earlier planting of full season soybeans would increase yield. All plots were harvested timely with soil and tissue samples collected. Samples are pending analysis at University of Delaware Soil Testing Laboratory. Yield data from 2021 and 2022 will be presented herein.

Results

UDeI Paired Study

A Pioneer variety soybean (P45T88E) was planted at Keedysville, Clarksville, and Wye Research and Education Centers (REC) at the following planting dates in 2021 and 2022 (Table 1). This variety was also planted by Dr. Miller at the Delaware location and seed was sourced through UD. Weather and seed availability delayed early plantings in both years, but once the first planting date was established, subsequent plantings were completed on time.

Table 1. Planting dates at three locations in MD in 2021 and 2022.

2021			
Locations	PD 1	PD 2	PD 3
Keedysville	May 11	May 29	June 7
Clarksville	April 21	May 5	May 19
Wye	April 23	May 12	May 28
2022			
Keedysville	April 28	May 11	May 31
Clarksville	April 18	May 2	May 16
Wye	May 2	May 23	June 7

Yield data from both 2021 and 2022 are presented in Figure 1. We did not observe the predicted response of increased yields with earlier planting dates in either year of the study. It is possible that we did not plant early enough in the season to maximize vegetative growth, although the first plantings in each year likely took place as soon as farm crews at the REC locations were able to get into the field, so it is unlikely that the first plantings could be pushed earlier.

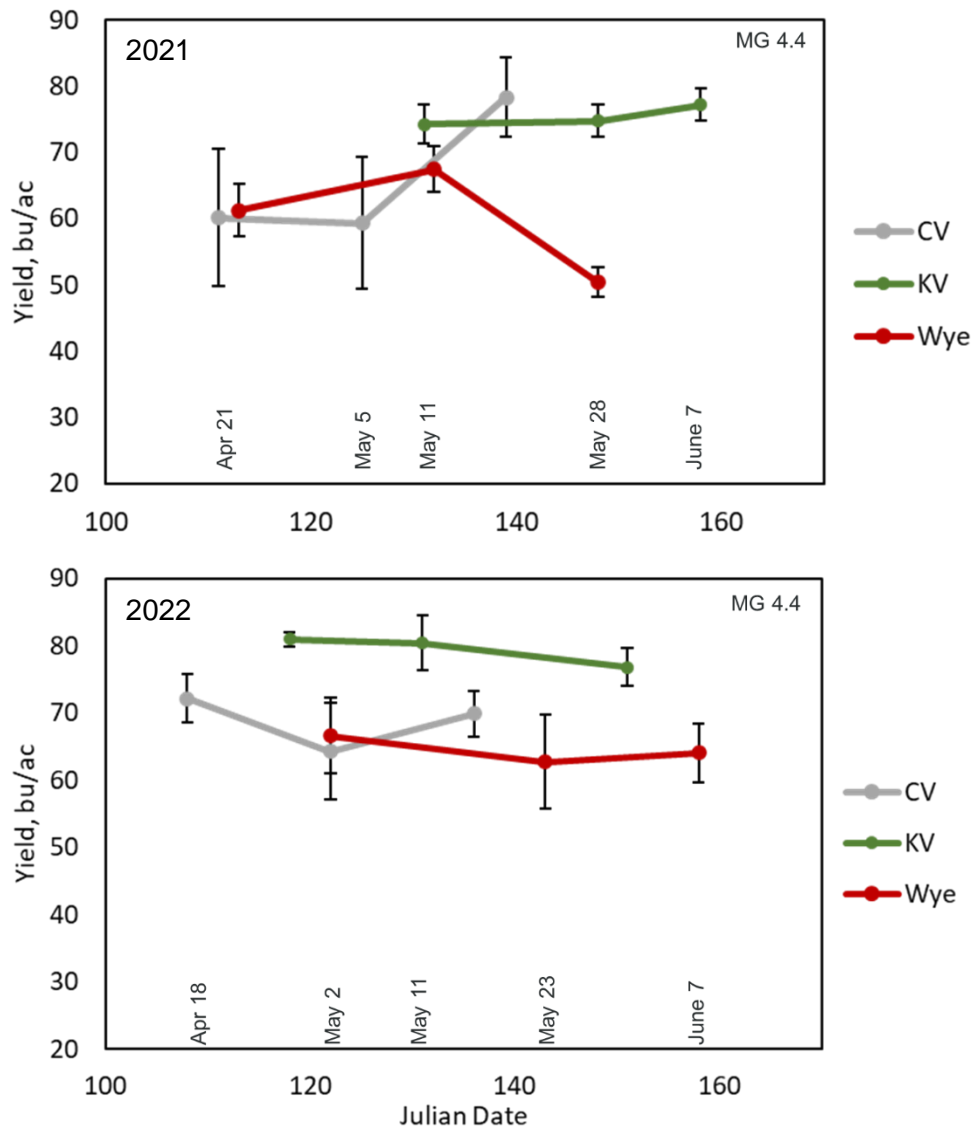


Figure 1. Average soybean yield (average of six replicates per location) and standard error of the mean of one soybean variety across three planting dates per location per year.

The Wye plantings could have begun earlier in 2022, however we did not observe a penalty for the later planting. The impact of late (or early) planting could be more location dependent. We will provide an update when soil and tissue samples have been analyzed. Data from 2021 did not indicate a clear relationship among nutrients in soils and tissue samples across the maturity groups planted.

Early Planted Variety Trials

In 2022, we duplicated the soybean variety trials at two locations (Clarksville and Wye RECs) and planted the entire trial at both an early and regular planting date. Table 2 shows the planting dates for the two locations.

Locations	Early Planting	Regular Planting
Clarksville	May 11	June 2
Wye	April 29	May 19

Table 2. Planting dates for the duplicated soybean variety trial at two MD locations in 2022.

Each variety was replicated three times in the early and regular planted test. Yield was collected from all plots and yield difference was calculated for each entry. Yield difference was the average yield from the entry in the early planted test subtracted from the average yield for the entry in the regular planted test. We predicted a higher yield for the early planted test, therefore a negative yield difference for each entry was predicted. Figures 2 and 3 depict the yield difference at both locations in 2022 by entry (sorted by maturity group and yield difference) with legend entries indicated maturity groups.

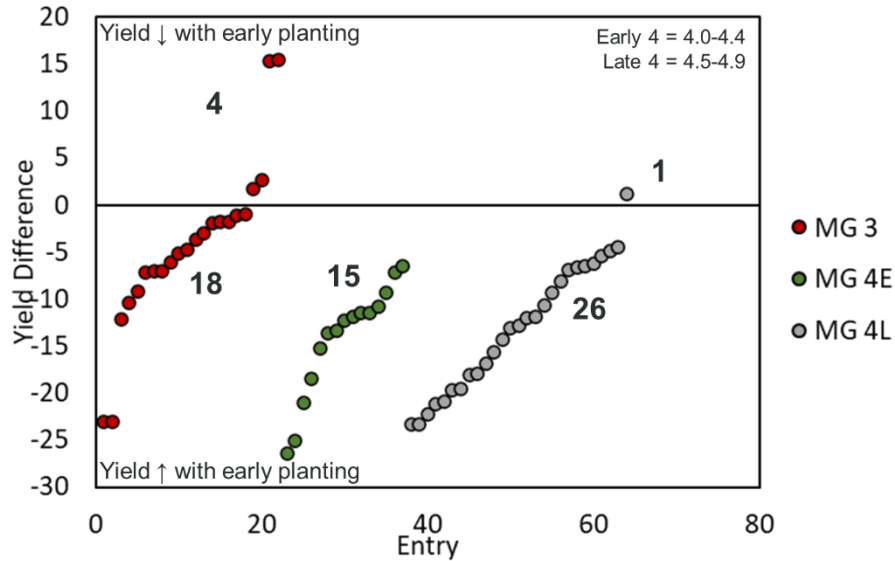


Figure 2. Yield difference of entries in soybean variety trials planted at an early and regular date by maturity group at Clarksville location. Numbers on graph indicate the count of entries with either a positive or negative yield difference in that maturity group.

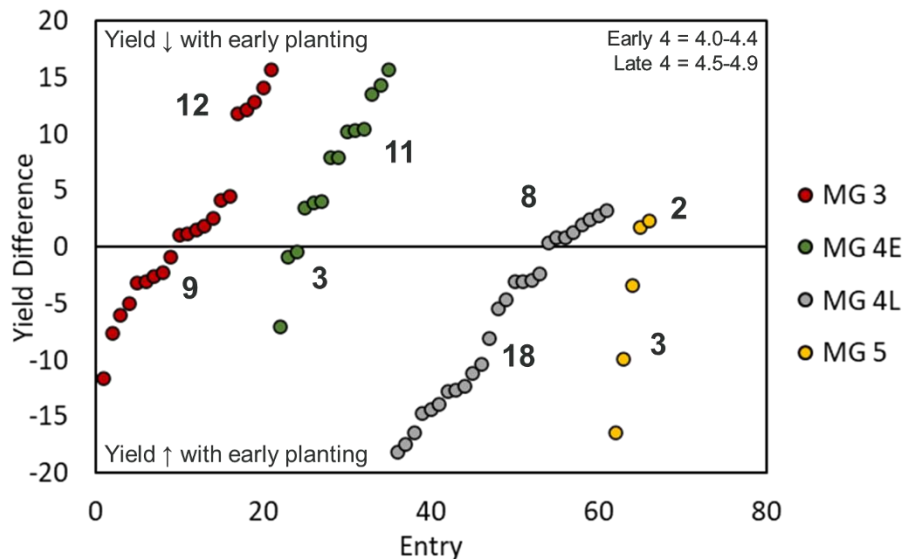


Figure 3. Yield difference of entries in soybean variety trials planted at an early and regular date by maturity group at Wye location. Numbers on graph indicate the count of entries with either a positive or negative yield difference in that maturity group.

At Clarksville, there was a general trend of increased yield with early planting across all maturity group categories, however that trend was not as apparent at the Wye location. In fact, the MG 3 and early MG 4

soybeans yielded better with the regular planting date at this location. Results such as these prevent the generation of sweeping recommendations for the state and we anticipate that the impact of early planting will likely be more apparent in some areas of the state, not necessarily across the entire state. We will perform this project again in 2023 to observe the impacts of year on these data.

Benefits to Soybean Farmers

After multiple years of this study, we plan to provide soybean farmers with updated recommendations on planting date for soybeans, namely across different maturity groups. As production systems shift with the increasingly unpredictable spring weather, farmers are looking for guidance on how they may change planting date to increase resiliency and productivity of their operations – by maintaining or increasing soybean yields. While shifting planting date is a risky decisions, we hope to present local data to soybean farmers who can use the information to balance the risks and rewards of early planting on their operations.