



Response of Soybeans to Planting Date and Relative Maturity in Northwest Iowa

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Planting date and variety selection are two inexpensive management practices farmers can manipulate to increase their profitability. Yet very little research is conducted on this topic. To address these questions, the North Central Soybean Research Program, funded by the Soybean Check-Off, has initiated a multi-state project. The purposes of this project are to understand the risks and benefits of planting soybean in the same planting window as corn (late April vs. mid May), and determine the optimum soybean relative maturity for soybean planting in the normal corn planting window. The overall hypothesis is that a later soybean variety planted early will yield more than normal soybean maturities planted under normal soybean planting dates.

Materials and Methods

This study has been conducted for three years with a total of 30 locations across the state. In each experiment, soybean representing two relative maturities were planted during the normal corn planting window for the area (late April to early May), and during the normal soybean planting window (mid May to early June). The two relative maturities consisted of a variety with a relative maturity that is considered normal for the area. An additional soybean variety that is about 0.5 relative maturity later was included to test the concept of “Late Soybeans, Planted Early.” Research plots were replicated four times and stand counts and yield were measured in the plots. In Table 1 are the planting dates for two locations in Northwest Iowa for the three years of the study.

Research data was analyzed using multilocation model procedures where locations and replicates with locations were considered random effects. Statistical significance was determined by the pooled standard errors of the multilocation analysis using standard errors for the treatment by location interaction.

Results and Recommendations

The three-year average response for the Sutherland site indicates a four bushels per acre advantage for planting a later maturing variety in the normal corn planting window (Table 2, significant at $P > t = 0.001$). The 30-location average advantage from all Iowa locations was seven bushels per acre for a later maturing variety planted in the normal corn planting window. However, yield responses differed by year. For example, at Sutherland in 2019 and 2020, the average advantage for late soybeans planted early was four bushels per acre, but only two bushels per acre in 2021. Lack of heat unit accumulation between the two planting dates likely explain this lesser advantage.

For the site years of this study, the return on investment for a cropping system where later soybean varieties are planted in the normal corn planting window were substantial. Assuming a soybean market price of \$12 per bushels, a four-bushel yield advantage equates to \$48 additional revenue. However, this does not factor in costs of owning an additional planter to plant during the corn planting window, or the opportunity costs if this system delayed corn planting date.

Table 1: Locations and planting dates.

| Treatment ¹ | Sutherland Location | | | Newell Location |
|------------------------|---------------------|----------|----------|-----------------|
| | 2019 | 2020 | 2021 | 2019 |
| NRM, EP | May 7 | April 24 | April 22 | May 3 |
| NRM, LP | June 3 | May 22 | May 12 | June 4 |
| LRM, EP | May 7 | April 24 | April 22 | May 3 |
| LRM, LP | June 3 | May 22 | May 12 | June 4 |

¹Abbreviations: NRM = normal relative maturity for the area; EP = early planting date; LP = late planting date.

Based upon this research, the recommendation is for farmers in Northwest Iowa to plant some of their production during the corn planting window with slightly later varieties than normal. Planting too much production in the corn planting window could lead to yield losses if late season frost events occur, although none of the planting dates in this research incurred frost damage.

Table 2.

| Treatment¹ | 2019 | 2020 | 2021 | 3-year average | 30 locations average |
|------------------------------|-------------|-------------|-------------|-----------------------|-----------------------------|
| EP, NRM | 65 | 71 | 73 | 70 | 65 |
| LP, NRM | 63 | 66 | 73 | 67 | 63 |
| EP, LRM | 67 | 70 | 75 | 71 | 70 |
| LP, LRM | 66 | 68 | 75 | 70 | 67 |
| LSD (0.05) | 4.5 | 4.5 | 4.5 | 1 | 1 |

¹NRM = normal relative maturity for the area; EP = early planting date; LP = late planting date.