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Using the Soybean Planting Decision Tool to Help Make Planting Date and Maturity Selection

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Abstract
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Using the Soybean Planting Decision Tool to Help Make Planting Date and Maturity Selection

By Mark Licht, Ranae Dietzel and Sotirios Archontoulis, Department of Agronomy

Determining when to plant soybeans and selecting variety maturities are two critical decisions that Iowa farmers make each year. These two decisions greatly affect yield potential and economic return. Typically, soybean variety selection occurs months before soybean planting occurs. An added complexity is current weather conditions at the time of planting.

Through project funding by the Iowa Soybean Association and in partnership with the On-Farm Network an interactive, web-based decision tool was developed to increase the understanding of the complex interactions between maturity selection, planting date and location. The Soybean Planting Decision Tool can be found at; http://agron.iastate.edu/CroppingSystemsTools/.

The Soybean Planting Decision Tool was designed to be a decision-aid for farmers and agronomists. This tool assesses crop staging and frost risks as well as soybean yield response to maturity and planting date. The current version of the Soybean Planting Decision Tool contains a database with more than 107,000 data points that includes APSIM model simulations and field measurements. The tool is designed to allow exploration of 24 planting dates and 12 maturities based on simulated soybean yields using APSIM and a 34-year historical weather record at nine locations across Iowa. The locations used for this web tool development are centrally located within each of Iowa's nine crop reporting district.

There are a couple of dynamics to be considered with planting date and maturity selection. Generally, there is an ideal planting date window (Figure 1). Planting earlier results in slightly lower yield potential and planting later can result in slight to large decreases in yield potential. This phenomenon dictates that farmers should plant in the ideal planting window or earlier to minimize risk of yield loss due to late planting from excessive rainfall during the planting window.

The Soybean Planting Decision Tool allows farmers and agronomists to identify the interaction of maturity selection and date of planting (Figure 2). It has been long understood and recommended that full season varieties should be planted because of greater yield potential. However, full season varieties require a longer growing season for those higher yield potentials to be realized and earlier planting comes with greater risk of crop failure due to low temperatures and late spring frosts.

The Soybean Planting Decision Tool is currently in version 1.0. The tool is being continuous adjusted as new soybean planting date and maturity trials become available. Additional versions will include greater resolution of the tool to include additional locations, historic weather, and management information. This decision-aid is a unique, multidimensional approach

incorporating field research, cropping systems modeling, statistical analysis, and expert knowledge to create a web-based, interactive tool.

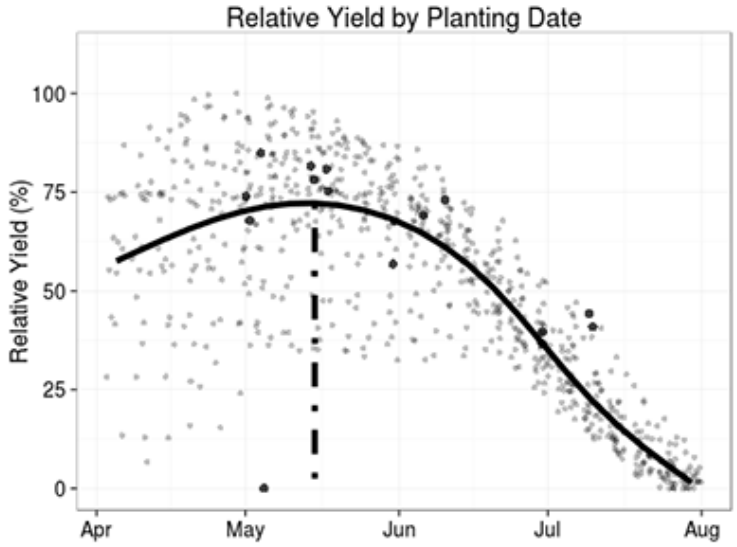

Figure 1. Relative yield response to planting date from the Soybean Planting Decision Tool where estimated yields are transformed to relative yield by dividing each individual yield point by the maximum yield for the selected dataset. In this example the selection criteria was southwest Iowa, maturity group 2.5. Simulated data points are shown for the 34-year weather record (grey dots) and 2014 actual data is presented (black dots).

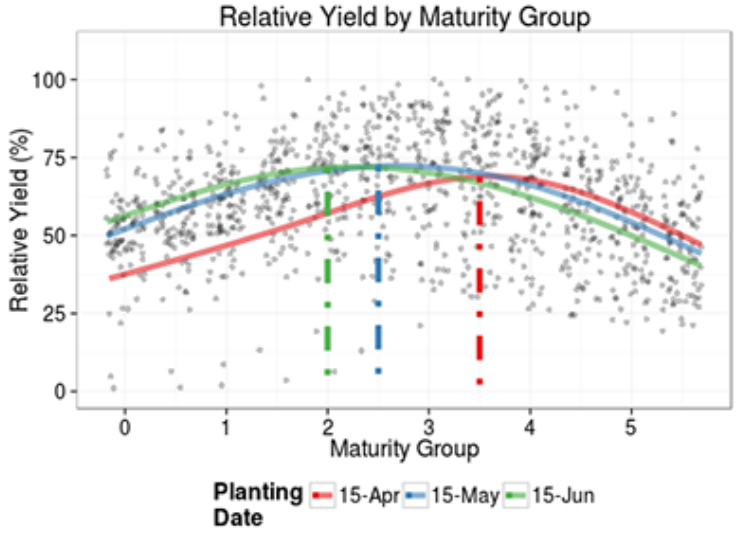

Figure 2. Relative yield response to maturity group selection for the Soybean Planting Decision Tool where estimated yields are transformed to relative yield by dividing each individual yield point by the maximum yield for the selected dataset. In this example the selection criteria was southwest Iowa with planting dates of the 15th of April, May and June.

Soybean Planting Decision Tool developed as a decision aid to help farmers and agronomists choose soybean maturity and planting dates. The tool can also be used to understand soybean growth and maturity interactions with date of planting.

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