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Evaluating Double-Cropping and Intercropping Soybean and Winter Wheat Viability in Wisconsin in 2022

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Background

The USDA Risk Management Agency has expanded the double cropping insurance map to include counties in Wisconsin starting in 2023. Therefore, it is important to better understand how to manage double-crop soybeans in Wisconsin. This year we conducted three trials relating to double cropping and intercropping soybean and winter wheat. Trail A was assessing the viability of intercropping soybean and soft red winter wheat in Wisconsin. Intercropping is defined as growing two or more crops simultaneously in the same field to harvest both crops. Study B was a planting date and maturity group study to better understand how those factors affect soybean yield. Lastly, Study C was a maturity group by seeding rate study to make recommendations for Wisconsin farmers who wanted to grow a double-crop soybean. All trials were conducted at the Arlington Research Station in Arlington, Wisconsin.

Methods

Study A was a split-split plot with a randomized block design. The whole plot was intercrop soybean, intercrop wheat, monocrop soybean, and monocrop wheat. The split plot was strip-till, and no-till soybean planted into the winter wheat across three planting dates, April 29, May 9, and May 19. The split-split plot was foliar fungicide applied to the wheat at Feekes 10.5.1. Soybeans were planted in 30-inch rows at 140k seeds per acre and wheat was drilled in 7.5-inch rows at 1.75 million seeds per acre. The wheat was harvested on July 21, 2022. During the process, we did clip some leaves off the intercrop soybeans. The soybeans continued to grow and were harvested this fall on October 18.

Study B was a split-plot randomized block design where we assessed planting date and maturity group effects on soybean yield. The whole plot was 5 soybean planting dates, May 9th, May 19th, June 10th, June 30th, and July 20th. The split-plot was maturity groups ranging from 0.3 - 2.9. There were 60 plots per planting date, 10 varieties planted twice, and 40 varieties planted once. The soybeans were planted in 15-inch rows at 140k seeds per acre.

Study C was a split-plot randomized block design that aimed to help make maturity group and seeding rate recommendations to farmers who are interested in double cropping soybeans. The whole plot was soybean maturity groups ranging from 0.5 – 2.5 and the split-plot was 6 soybean seeding rates ranging from 80k – 280k seeds per acre. We planted the soybeans the day after the wheat harvest on July 22nd. The soybeans emerged

quickly due to some timely rains. In the first week of October, the soybean got some frost damage on the leaves associated with the top 3 to 4 nodes.

Results

Study A - Based on our results, the wheat averaged 86 bushels per acre, and no treatments affected yield. Also, there was no statistical difference in yield across planting dates (Figure 1) nor was there a difference between strip-till and no-till in monocrop soybeans (Figure 2). For intercrop soybeans, our data showed that the latest planting of May 19th along with using strip-till produced the highest yields. Lastly, we conducted a basic economic analysis and determined that monocrop soybeans are more profitable when compared to our version of intercropping at $8 and $14 soybean market prices (Figure 3). We used a wheat market price of $5.40 when considering wheat income in the intercrop systems.

Figure 1. Soybean Yield by Planting Date.

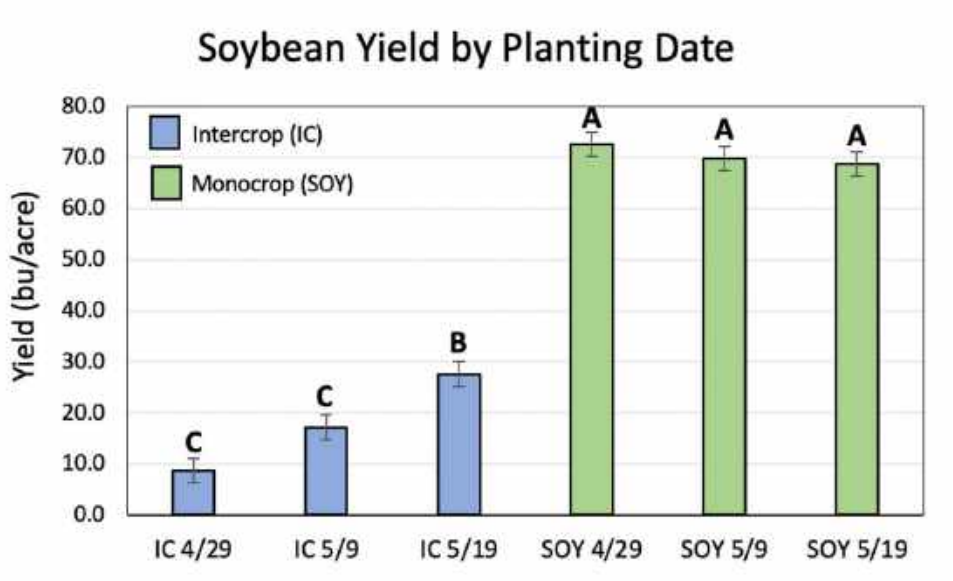


Figure 2. Soybean Yield by Tillage

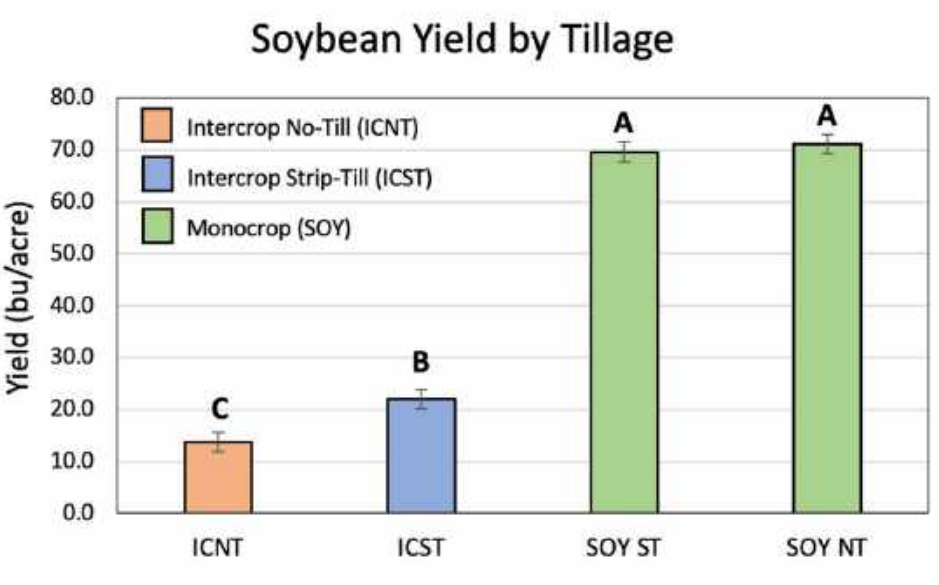
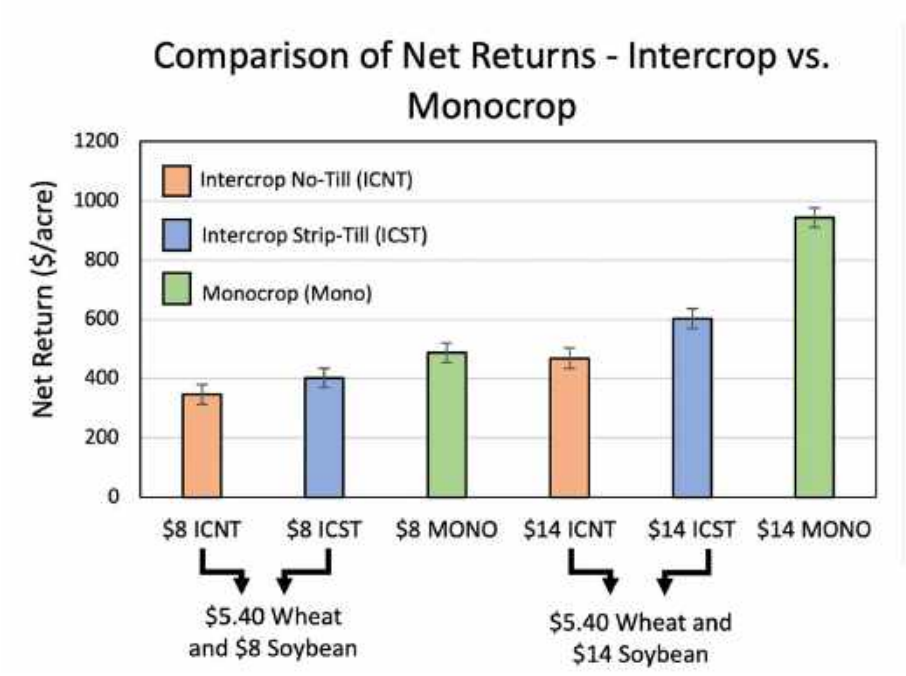


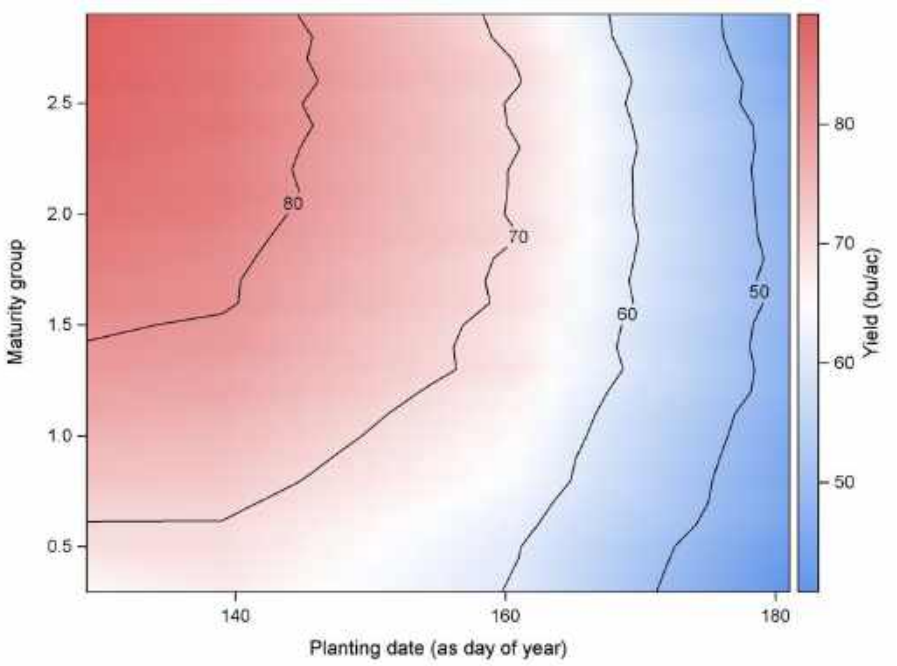
Figure 3. Net Returns of Intercrop vs. Monocrop



Study B - Our data concluded that earlier planting along with using the longest viable maturity group results in the highest yields (Figure 4). It is important to note that the last planting date of July 20th was accidentally harvested too early and all the data from that date was lost. The planting date cannot be changed with double-

crop soybean since it is determined by the date of the wheat harvest. However, our data, along with others, indicates that using the longest maturity group that will mature before a killing frost in the fall is the best option.

Figure 4. Planting Date x Maturity Group Soybean Yield



Study C - Unfortunately, we were unable to obtain any data from Study C due to the cold weather halting the soybean growing process and preventing us from being able to harvest them.

Future Plans

Next year we will be repeating Study A along with adding a skip-row wheat treatment to allow for more room for the soybeans to develop. We will be repeating both Studies B and C to obtain another year of data and hopefully harvest a double-crop soybean. Overall, double-crop success in Wisconsin is going to depend on the conditions of the specific year however, for farmers who want to attempt double-cropping it is important to have recommendations in place.

This is a preliminary report meant to relay preliminary findings. More data will be released once the trial is complete. This data is not for publication.

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