

Double Cropping Wheat and Soybeans for Maximum Profit

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Dennis Pennington, MSU Wheat Extension Specialist

Background

Planting soybeans as a second crop after wheat harvest is popular in Kentucky and Ohio and has been tried by growers in southern Michigan. The goal of double cropping is to increase profit per acre by producing a second crop on the same ground. In years where wheat matures and is harvested early, the chance of success is increased. Additionally, soil moisture at the time of planting soybeans is critical for quick germination and improves the ability of the soybean plant to reach grain fill and maturity. Access to irrigation would improve the success rate and reduce variability due to lack of rainfall. There are some newer wheat varieties that flower 4-5 days earlier than traditional lines. Planting these varieties in combination with early harvest where double cropping is desired would also increase the chance of success.

Hypotheses:

1. Planting early maturing wheat varieties will increase the yield of double crop soybeans
2. Early wheat harvest timing will produce greater soybean yields compared to the late wheat harvest timing.
3. Different wheat varieties will affect yield, moisture and profitability

Methods of research: In fall of 2016, research plots were established on the Henry Miller Farm in St. Joe County using his equipment to prepare, plant and harvest. Plot size was 45 foot wide by 755 feet long. Wheat was planted with a John Deere 1560 drill on Oct. 10, 2016 and harvested with a John Deere 9760 STS combine with a 40 foot header. Four varieties of wheat with a range of flowering dates from 147-152.2 Julian Date (number of days past Jan. 1). Four replications were planted. The plots were split in half with the front half (377 feet) being harvested July 1, 2017 and the back half on July 7, 2017. Soybeans were planted the day after wheat was harvested. Immediately after soybeans were planted, 1" of water was applied with a center pivot irrigation system. Yield monitor data for wheat is reported in Table 1. Soybeans were harvested on November 25, 2017. For soybeans, two rows 1 meter in length were hand harvested and threshed and is reported in Table 2. Crop inputs, tillage operations and management was the same across all plots.

Table 1. Yield and moisture data for wheat harvested at early (July 1) and late timing (July 7).

Wheat Variety	JDF	Early		Late	
		% Moisture	Yield (bu/a)	% Moisture	Yield (bu/a)
Agrimax 413	148.3	16.2%	110.4	15.2%	108.5
Butler	152.2	15.4%	114.8	14.8%	114.9
DF105R	147.0	16.0%	101.4	15.3%	102.8
Sunburst	150.7	16.3%	110.3	16.3%	104.8
Mean	149.6	16.0%	109.2	15.4%	107.7

In this trial, the variety with earliest maturity (147 JDF) had the lowest yield and the highest yield went to the latest maturing variety. The average of the early harvest was 1.5 bushels per acre higher than the late harvest. By waiting one week, the harvest moisture dropped on average 0.6%.

Table 2. Soybean yield data from the 16 wheat plots. For soybeans, we planted the same variety as we were only testing if the early harvest date made a difference in soybean yield potential.

Plot	Early		Late	
	% Moisture	Yield (bu/a)	% Moisture	Yield (bu/a)
1	6.6%	44.2	6.7%	38.2
2	6.6%	43.9	6.7%	39.0
3	6.6%	46.6	6.7%	38.4
4	6.6%	44.9	6.6%	43.8
5	6.6%	35.5	6.6%	43.9
6	6.5%	37.7	6.7%	36.7
7	6.7%	42.7	6.6%	37.5
8	6.6%	41.3	6.7%	41.3
9	6.6%	47.7	6.6%	41.7
10	6.6%	42.1	6.7%	46.6
11	6.7%	43.5	6.6%	48.8
12	6.7%	42.4	6.7%	36.7
13	6.6%	45.3	6.9%	32.3
14	6.7%	39.3	6.7%	44.1
15	6.7%	38.0	6.8%	38.8
16	6.8%	39.7	6.7%	41.6
Mean	6.6%	42.2	6.7%	40.6

Soybeans were planted immediately following harvest of wheat in each of the 16 plots. One variety of soybean was planted across all plots, as the objective was to quantify the benefit of harvesting wheat early. Data from the soybean harvest were not statistically different from each other. Numerically, the early harvested area produced 1.6 bushels per acre more soybean yield. Moisture content was the same.

Results and Discussion: The key to getting high yield potential for the double crop soybean is dependent on a number of variables including cooperating weather for wheat harvest and adequate soil moisture/rainfall for rapid soybean germination. Wheat needs to come off as early as possible to get soybeans planted as early as possible. In this trial, we tested four wheat varieties with varying maturities and found that longer maturity wheat produced higher yields in 2017. The average moisture of the early harvest wheat was 16%. Wheat matured quickly and we should have harvested a few days earlier as our target was 20-22% moisture. That would have given us a wider window between harvest dates and we would have likely seen a bigger response to harvest date. Economics also play a role. The cost of drying wheat harvested early needs to be weighed against the added soybean yield gained by planting soybeans earlier. This trial was meant to be more of a demonstration than a detailed research project. It is suggested that additional research be conducted to determine the optimum harvest timing and maturity of wheat and double crop soybean yield. Weather varies from year to year, so a multi-year project would be recommended to evaluate over a range of weather conditions.