

Year 1- Final Report

Double Crop Soybean Recommendations

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Background: With the construction of a malting facility in Union County, the number of double crop soybean acres is expected to increase and expand north as winter malting barley is harvested approximately two weeks earlier compared to winter wheat. Initially, in 2019, the malting facility will demand 50,000 acres of high quality malting barley and scale up to over 200,000 acres at full capacity over the next ten years. The premiums offered for high quality malting barley grain coupled with double crop soybean production will be a very profitable cropping system for farmers in Ohio. However, soybeans planted later in the growing season (mid-June through early July) require different management compared to soybeans planted in May. This research will provide recommendations for soybeans planted later in the growing season.

Project Objectives: The objectives of this project are to: 1) Develop double crop soybean recommendations following winter malting barley including *Rhizobia* inoculant, fungicide + insecticide seed treatment, foliar fungicide at R3, foliar insecticide at R3, and foliar insecticide at R5, 2) Evaluate the effect of winter malting barley biomass and residual nitrogen on double crop soybean stand and yield, 3) Generate Extension programming and materials to transfer knowledge to farmers and other stakeholders, and 4) Identify early-maturing winter-hardy barley with high malting quality to further expand double crop soybean opportunities. (Note: Fourth objective will be funded by Origin Malts.)

Objective 1: In 2018, trials were established at the OARDC in Wooster (June 29) and Western Agricultural Research Station in Clark County (June 26) following barley harvest. Due to plot space limitations, we did not test the *Rhizobia* inoculant treatment. At the OARDC Western location, there was no difference in soybean yield among the treatments ($\alpha = 0.10$) (Table 1). At the OARDC Wooster location, soybean yield increased by 6.2 and 5.6 bu/acre when foliar fungicide and foliar insecticide, respectively, were applied at the R3 growth stage.

Table 1. Soybean grain yield (bu/acre) in 2018. Average yield shown for enhanced and traditional treatments. Changes in yield from respective enhanced or traditional system shown for all other treatments.

	Treatment	Western OARDC	Wooster OARDC
1	Enhanced (E)	50.4	45.4
2	E – seed treatment	+2.9	+2.9
3	E – fungicide @ R3	-4.5	-2.5
4	E – insecticide @ R5	-1.2	+0.5
5	E – insecticide @ R3	+0.8	2.4
6	Traditional (T)	48.3	40.5
7	T + seed treatment	+1.3	+0.2
8	T + fungicide @ R3	+3.6	+6.2*
9	T + insecticide @ R3	+0.5	+5.6*
10	T + insecticide @ R5	+1.0	+3.8
	E vs. T	*ns	*ns

Objective 2: In 2018, trials were established at the OARDC in Wooster (June 29) and Western Agricultural Research Station in Clark County (June 26) following barley harvest. At the Western location, double crop soybean yield ranged from 59 to 65 bu/acre. However, soybean yield was not influenced by the previously planted barley cultivar or nitrogen application rate. At the Wooster location, double crop soybean yield ranged from 38 to 50 bu/acre. Soybean yield was influenced by the previously planted barley cultivar, but not the previous N application rate. The cultivar ‘Puffin’ and one of Dr. Eric Stockinger’s barley lines (very low biomass production) resulted in greater soybean yield (+2 to 3 bu/acre) compared to Dr. Stockinger’s second barley line.

Objective 3: Double crop soybean production guidelines are available online at:

<https://stepupsoy.osu.edu/soybean-production/double-crop-soybean-production-guidelines> This webpage includes information on planting date, relative maturity selection, row spacing, and seeding rate. This information can also be downloaded as a pdf for easy printing. During the second year of this project, the website will be updated to include seed treatment, foliar fungicide, and foliar insecticide results.



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Double Crop Soybean Production Guidelines

Double Crop Soybean Production Guidelines

Introduction

Double cropping is the establishment and harvest of a second crop (usually soybean) the same season that a first crop is harvested (usually a small grain). There are two primary requirements for profitable double cropping:

1. There must be adequate time for the production of the soybean crop.
2. There must be adequate water to produce both crops, whether from stored soil moisture, rainfall, or irrigation.

Double crop soybean management differs than traditional, full-season soybean management. Double cropping with soybean drastically reduces the elapsed time between successive crops and therefore can greatly increase the disease pressure of both soybean and small grains. Here, the differences in management practices are discussed.

Planting Date

The date of planting has more effect on soybean grain yield than any other production practice. Early planting of double crop soybean is essential for success and can be accomplished two ways:

1. Harvesting wheat when grain moisture is 18 to 20 percent. Wheat grain is sometimes accepted at a higher moisture content. Otherwise, grain can be dried using air with or without supplemental heat to dry the grain. Wheat harvested at a higher moisture generally has greater yield and quality. When dry grain is re-wetted in the field, grain may sprout, yield and test weight will be reduced, and vomitoxin may increase. Grain will be significantly discounted or rejected for low test weight and high vomitoxin levels.
2. Planting double crop soybean after winter barley. Winter barley is harvested