

Kansas Agricultural Experiment Station Research Reports

Volume 7
Issue 2 *Southeast Research and Extension*
Center Agricultural Research

Article 9

2021

Effect of Burning and Tillage Options on Yields in a Continuous Wheat-Double-Crop Soybean Rotation

D. W. Sweeney
Kansas State University, dsweeney@ksu.edu

D. R. Presley
Kansas State University, deann@ksu.edu

D. A. Ruiz Diaz
Kansas State University, ruizdiaz@ksu.edu

Follow this and additional works at: <https://newprairiepress.org/kaesrr>



Part of the [Agronomy and Crop Sciences Commons](#)

Recommended Citation

Sweeney, D. W.; Presley, D. R.; and Ruiz Diaz, D. A. (2021) "Effect of Burning and Tillage Options on Yields in a Continuous Wheat-Double-Crop Soybean Rotation," *Kansas Agricultural Experiment Station Research Reports*: Vol. 7: Iss. 2. <https://doi.org/10.4148/2378-5977.8048>

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 2021 Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.



Effect of Burning and Tillage Options on Yields in a Continuous Wheat-Double-Crop Soybean Rotation

Abstract

Double-cropping soybeans after wheat is common in southeastern Kansas and yields of double-crop soybean during the three years of this study were not affected by management of previous wheat straw practices such as burning or tillage done before planting. However, in the second and third year of the study, subsequent wheat yields were increased by 30% or more when the wheat residue had been burned the previous year.

Keywords

Double-crop, soybean, wheat residue, burn, tillage

Creative Commons License



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

Cover Page Footnote

This work is supported by the U.S. Department of Agriculture National Institute of Food and Agriculture, Hatch project KS00-0104-HA.

Effect of Burning and Tillage Options on Yields in a Continuous Wheat-Double-Crop Soybean Rotation

D.W. Sweeney, D.R. Presley,¹ and D.A. Ruiz Diaz¹

Summary

Double-cropping soybeans after wheat is common in southeastern Kansas and yields of double-crop soybean during the three years of this study were not affected by management of previous wheat straw practices such as burning or tillage done before planting. However, in the second and third year of the study, subsequent wheat yields were increased by 30% or more when the wheat residue had been burned the previous year.

Introduction

Double-cropping of soybeans after wheat is practiced by many producers in southeastern Kansas. Several options exist for dealing with wheat straw residue from the previous crop before planting soybeans. However, the method of managing the residue may affect not only the double-crop soybeans but also the following wheat crop. The objective of this study was to determine the effect of burning or not burning with three tillage options (reduced-till, strip-till, and no-till) on double-crop soybean and subsequent wheat yields.

Experimental Procedures

Six wheat residue management systems for double-crop soybean and the subsequent wheat crop were established in spring 2017. The experiment was a split-plot arrangement of a randomized complete block with three replications. The whole plots were burn and no-burn and the subplots were tillage options of reduced-till, strip-till, and no-till prior to planting the double-crop soybeans. In each year after the soybean harvest, the entire area was disked, field cultivated, fertilized, and planted to wheat. Thus, treatment effects on wheat yield were due to the residual from the residue management treatments for the double-crop soybeans.

Results and Discussion

In 2017, 2018, and 2019, burning versus not burning the wheat straw or tillage options prior to planting had no significant effect on double-crop soybean yields. In 2018, after one year of a continuous wheat-double-crop soybean rotation, subsequent wheat yields

¹ Department of Agronomy, College of Agriculture, Kansas State University, Manhattan, KS.

were unaffected by the residual of burn or tillage treatments. However, in both 2019 and 2020 wheat yields were increased by 30% or more where the wheat residue had been burned in the previous year, even though wheat yields were unaffected by using reduced-, strip-, or no-tillage to plant the previous double-crop soybeans.

Acknowledgment

This work is supported by the U.S. Department of Agriculture National Institute of Food and Agriculture, Hatch project KS00-0104-HA.

Table 1. Effect of residue management on double-crop soybean and subsequent wheat yields

Residue management ¹	Double-crop soybean yields			Wheat yields		
	2017	2018	2019	2018	2019	2020
	----- bu/a -----					
Burn						
Yes	36.4	33.5	40.7	55.4	48.5	32.1
No	38.2	38.0	44.7	55.4	34.3	24.7
LSD (0.10)	NS	NS	NS	NS	6.9	7.4
Tillage						
Reduced-till	38.3	33.5	42.4	55.2	42.4	28.3
Strip-till	36.1	36.6	42.2	56.9	40.6	28.3
No-till	37.4	37.2	43.6	54.2	41.2	28.6
LSD (0.10)	NS	NS	NS	NS	NS	NS

¹Residue management effects on wheat yields are the residual following those treatments for the double-crop soybeans in the previous year.