

On-Farm Cover Crop Demonstration Trials

RFR-A1940

Jim Fawcett, extension field
agronomist (retired)

Andrew Weaver, Northwest Farm,
ag specialist

Lyle Rossiter, Allee Farm, superintendent

Jim Rogers, Armstrong Farm, ag specialist

Cody Schneider, Southeast Farm, co-manager

Introduction

Cover crops can benefit farmers by aiding in soil erosion control, increasing organic matter in the soil, and reducing nitrate losses into surface waters. Cover crops also have been promoted to alleviate soil compaction and improve soil drainage. Cover crops are an important practice in meeting Iowa's nutrient reduction strategy goals. However, some research has indicated that planting corn following a rye cover crop can result in corn grain yield reduction, especially if the cover crop is not killed at least two weeks prior to planting the corn. The objective of these trials was to evaluate whether a cover crop would affect corn and soybean yield.

Materials and Methods

In 2019, cover crop use was examined in four trials in corn and one trial in soybean (Table 1). Two trials were conducted on-farm by farmer cooperators, one trial was at Dordt University, and two trials were on research farms. Strips were arranged in a randomized complete block design with at least three replications per treatment. Strip width and length varied from field-to-field depending on field and equipment size. All strips were machine harvested for grain yield.

In Trial 1, four seedings of cover crop were broadcast over corn at V6 and worked in with field cultivator shovels and compared with no cover crop (Table 2). The treatments were

4 lb/acre rye plus 4 lb/acre red clover plus 2 lb/acre tillage radish; 10 lb/acre rye; 10 lb/acre red clover; and 10 lb/acre tillage radish. In Trial 2, oats were interseeded at 32 lb/acre plus rye at 25 lb/acre plus radish at 2.5 lb/acre plus turnip at 2.5 lb/acre plus red clover at 2.5 lb/acre into V7 corn. In Trial 3, red clover was interseeded at 15 lb/acre plus alfalfa at 2 lb/acre plus tillage radish at 3 lb/acre into V5 corn. In Trials 2 and 3, corn planted in 30-in. rows was compared with corn planted in 60-in. rows. In Trials 4 and 5, rye at 37 lb/acre plus turnip at 2 lb/acre was drilled in late October. In Trial 4, the rye was killed with glyphosate at 6-8 in. tall April 24, which was more than five weeks before the corn was planted. In Trial 5, the rye was killed with glyphosate at 4 ft tall June 7, which was four days after the soybean was planted. Corn and soybean without a cover crop were compared with the crops planted with a cover crop in Trials 4 and 5.

Results and Discussion

In Trial 1, there was no difference in yield among the various cover crops and the no cover crop (Table 2). In Trial 2, there was no difference in yield between the corn planted in 30-in. rows and the corn planted in 60-in. rows. In Trial 3, the corn planted in 60-in. rows yielded 12 bushels/acre less than the corn planted in 30-in. rows. There was an increase in weed population with the corn planted in 60-in. rows. In Trial 4, a fall-seeded rye cover crop did not affect corn yield. In Trial 5, a fall-seeded cover crop did not affect soybean yield. The results of these trials indicate corn and soybean can be planted following a cover crop without hurting the yield. These trials also indicate it is possible to interseed a cover crop into standing corn without affecting the yield.

Planting corn in 60-in. rows to increase the interseeded cover crop stand may result in lower corn yields compared with corn planted in 30-in. rows.

NOTE: The results presented are from replicated demonstration trials. Statistics are used to detect differences at a location and should not be interpreted beyond the single location.

Table 1. Variety, row spacing, planting date, planting population, previous crop, and tillage practices from cover crop trials in corn and soybean in 2019.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage practices
190112	1	Sioux	Pioneer PO157AMXT	30	5/25/19	34,000	Corn	Disked
190202	2	Buena Vista	Channel CSX52A18	30 & 60	5/4/19	35,000	Soybean	Mulch till
190601	3	Pottawattamie	Wyffels 6896	30 & 60	4/19/19	34,000	Soybean	Disked
190701	4	Henry	Pioneer P1093	30	6/3/19	32,000	Soybean	Minimum till
190702	5	Henry	Pioneer P33A53X	30	6/3/19	145,000	Corn	No-till

Table 2. Yield from cover crop in corn and soybean trials in 2019.

Exp. no.	Trial	Treatment	Yield (bu/ac) ^a	P-value ^b
190112	1	4 lb/ac rye + 4 lb/ac red clover + 2 lb/ac tillage radish at V6	157 a	0.09
		10 lb/ac rye at V6	161 a	
		10 lb/ac red clover at V6	155 a	
		10 lb/ac tillage radish at V6	162 a	
		No cover crop	161 a	
190202	2	32 lb/ac oats + 25 lb/ac rye + 2.5 lb/ac tillage radish + 2.5 lb/ac turnip + 2.5 lb/ac red clover seeded into 30-in. row corn at V7	249 a	0.13
		32 lb/ac oats + 25 lb/ac rye + 2.5 lb/ac tillage radish + 2.5 lb/ac turnip + 2.5 lb/ac red clover seeded into 60-in. row corn at V7	241 a	
190601	3	15 lb/ac red clover + 2 lb/ac alfalfa + 3 lb/ac tillage radish seeded in 30-in. row corn at V5	249 a	0.02
		15 lb/ac red clover + 2 lb/ac alfalfa + 3 lb/ac tillage radish seeded in 60-in. row corn at V5	237 b	
190701	4	37 lb/ac rye + 2 lb/ac turnip seeded 10/20/18	214 a	0.57
		No cover crop	213 a	
190702	5	37 lb/ac rye + 2 lb/ac turnip seeded 10/20/18	68 a	0.04
		No cover crop	67 a	

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.05.

^bP-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.