

On-Farm Cover Crop Demonstration Trials

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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 2018, cover crop use was examined in three trials in corn and three trials in soybean (Table 1). Three trials were conducted on-farm by farmer cooperators and three 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, 2.3 bushels/acre of oats was interseeded into R1 soybeans and worked in with row cultivation (Table 2). In Trial 2, red clover at 30 lb/acre was interseeded into V6 corn and harrowed in. In this trial, corn planted in 30-in. rows was compared with corn planted in rows alternating between two

30-in. rows and one 60-in. row. In Trial 3, red clover was interseeded at 30 lb/acre into V6 corn and harrowed in. In Trial 4, rye was drilled at 1 bushel/acre late October and killed with glyphosate when 3-4 in. tall April 10, which was 17 days before planting the corn. In Trial 5, a rye cover crop was seeded at one bushel/acre in late October and killed with glyphosate when 10-12 in. tall April 24, which was 15 days before planting the soybeans. In Trial 6, rye was broadcast with a fertilizer spreader in early September at 1.1 bushels/acre and killed with glyphosate May 26 when knee high, which was four days after the soybeans were planted. Corn and soybean without a cover crop were compared with the crops planted with a cover crop in Trials 1, 3, 4, 5, and 6.

Results and Discussion

In Trial 1, the oats cover crop had no effect on soybean yield (Table 2). Most of the oats died in the summer from competition with the soybeans. In Trial 2, the corn planted in 30-in. rows with the red clover cover crop yielded more than the corn planted in rows alternating between 2 30-in. rows and 1 60-in. row. In Trial 3, red clover interseeded into V6 corn did not affect the corn yield. In Trial 4, a fall-seeded rye cover crop did not affect corn yield. In Trials 5 and 6, a fall-seeded rye 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 and soybean without affecting the yield.

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 2018.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage practices
180212	1	Buena Vista	Champion CS20556CN	30	6/1/18	140,000	Soybean	Mulch till, harrow
180615	2	Pottawattamie	Wyffels W6946DGRIB	30 & 60	4/25/18	29,500	Soybean	No-till
180616	3	Pottawattamie	Wyffels W6946DGRIB	30	4/25/18	29,500	Soybean	No-till
180701	4	Henry	Pioneer P1138AM	30	4/27/18	34,000	Soybean	Minimum till
180702	5	Henry	Pioneer P311A22X	30	5/9/18	145,000	Corn	No-till
180815	6	Bremer	Channel Bio 2416R2X	30	5/22/18	144,000	Corn	Chisel plow

Table 2. Yield from cover crop in corn and soybean trials in 2018.

Exp. no.	Trial	Treatment	Yield (bu/ac) ^a	P-value ^b
180212	1	Oat cover crop seeded into R1 soybeans with row cultivation at 2.3 bu/ac	58 a	0.09
		No cover crop	59 a	
180615	2	Red clover cover crop broadcast at 30 lb/ac and harrowed into V6 corn planted in 30-in. rows	187 a	<0.01
		Red clover cover crop broadcast at 30 lb/ac and harrowed into V6 corn planted with rows alternating between 2 30-in. and 1 60-in. row	174 b	
180616	3	Red clover cover crop broadcast at 30 lb/ac and harrowed into V6 corn	194 a	0.29
		No cover crop	188 a	
180701	4	Rye cover crop drilled at 1 bu/ac on 10/21/17 and killed with glyphosate when 3-4 in. tall 4/10/18	219 a	0.68
		No cover crop	218 a	
180702	5	Rye cover crop drilled at 1 bu/ac 10/21/17 and killed with glyphosate when 10-12 in. tall 4/24/18	60 a	0.27
		No cover crop	59 a	
180815	6	Rye cover crop broadcast seeded with fertilizer spreader at 1.1 bu/ac in early September and killed with glyphosate when knee high 5/26/18	62 a	0.67
		No cover crop	61 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.