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On-Farm Cover Crop Trials

Jim Fawcett
Iowa State University

Tyler Mitchell
Iowa State University, tmitch4@iastate.edu

Jim Rogers
Iowa State University, jimrog@iastate.edu

Lyle Rossiter
Iowa State University, ltross@iastate.edu

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Jim Fawcett, extension field agronomist (retired)
Tyler Mitchell, Northeast Farm, ag specialist
Jim Rogers, Armstrong Farm, ag specialist
Lyle Rossiter, Allee Farm, superintendent

Introduction

Cover crops can benefit farmers by aiding in soil erosion control, increasing organic matter in the soil, and reducing nitrate losses into the 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 2016, cover crop use was examined in two trials in corn and two trials in soybean (Table 1). All trials were conducted on-farm by farmer cooperators, except Trial 1, which was conducted at the ISU Allee Farm. 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, one bushel/acre of rye was no-till drilled in mid-October 2015 following a soybean harvest. The cover crop was sprayed with glyphosate when it was about 18 in. tall on May 19, 2016. Soybeans were planted three days later. In Trials 2 and 3, 30 lb/acre rye and 85 lb/acre radish cover crop was seeded by air on September 1, 2015 into standing soybeans. The cover crop was killed with glyphosate when the plants were 6-10 in. tall, two weeks before planting the corn. In Trial 4, 20 lb/acre red clover was seeded on May 15, 2016 into corn at the V5 growth stage. The cover crop will be killed in 2017 prior to soybean planting. Corn and soybean without a cover crop was compared with the crops planted after a cover crop in all trials.

Results and Discussion

In Trials 1 and 3, the cover crop had no effect on soybean yield (Table 2). In Trial 2, the corn planted following a rye/radish cover crop yielded 15 bushels/acre more than the corn planted without a cover crop ($P = 0.03$). It is not known what caused the yield increase, although it is possible it could be due to decreased soil compaction and/or increased water infiltration. In Trial 4, there was a yield increase of four bushels/acre with the red clover cover crop seeded into corn at V5 ($P = 0.03$). It is unknown what caused this yield increase. The results of these trials indicate corn and soybean can be planted following a rye, rye/radish, or red clover cover crop without hurting the yield, and can result in yield increases.

Table 1. Variety, row spacing, planting date, planting population, previous crop, and tillage practices from cover crop trials in corn and soybean in 2016.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage practices
160212	1	Buena Vista	Syngenta 22S1	30	5/21/16	140,000	Corn	No-till
160803	2	Bremer	NuTech 5F-707AM	30	4/21/16	32,500	Soybean	No-till
160827	3	Bremer	NuTech 7233	30	5/21/16	160,000	Corn	No-till
160663	4	Adair	Pioneer PO937	30	5/19/16	35,000	Soybean	Chisel plow & disc

Table 2. Yield from on-farm cover crop in corn and soybean trials in 2016.

Exp. no.	Trial	Treatment	Yield (bu/ac)[a]	P-value[b]
160212	1	1 bu/ac rye cover crop seeded on 10/16/15	74 a	0.69
		No cover crop	74 a	
160803	2	30 lb/ac rye and 85 lb/ac radish cover crop seeded on 9/1/15	225 a	0.03
		No cover crop	210 b	
160827	3	30 lb/ac rye and 85 lb/ac radish cover crop seeded on 9/1/15	56 a	0.30
		No cover crop	54 a	
160663	4	20 lb/ac red clover seeded on 6/15/16 in V5 corn	177 a	0.03
		No cover crop	173 b	

[a]Values denoted with the same letter within a trial are not statistically different at the significance level of 0.05.
[b]P-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.