

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 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 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 2017, cover crop use was examined in three trials in corn and two trials in soybean (Table 1). All trials were conducted on-farm by farmer cooperators. 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, two bushels/acre of oats was no-till drilled on two dates in mid-October 2016, following a corn harvest and killed by a frost soon after emergence in late October (Table 2). Two soybean varieties of differing

maturities were planted in 2017. In Trial 2, cowpeas, red clover, and perennial ryegrass were broadcast seeded into corn at the V3 growth stage. In Trial 3, oats and turnips were no-till drilled in early October following a soybean harvest. The oats were killed by frost in mid-November when they were 8 in. tall. Some of the turnips survived the winter and were killed by tillage prior to planting the corn crop. In Trial 4, rye was no-till drilled in early October following a corn harvest. The rye was killed April 10 with glyphosate when it was 14 in. tall, 26 days prior to soybean planting. In Trial 5, rye was flown on in early September prior to soybean harvest. The rye was killed April 2 with glyphosate, 22 days prior to corn planting.

Results and Discussion

In Trial 1, there was no difference in soybean yield with the two dates of seeding of the oats cover crop or two soybean varieties (Table 2). In Trial 2, there was no effect on the corn yield of the cowpeas/red clover/perennial ryegrass cover crop interseeded into corn at the V3 growth stage. There was poor germination of the cover crop in this trial due to dry conditions. In Trial 3, there was no effect on corn yield with the oat and turnip cover crop. In Trial 4, the rye cover crop had no effect on soybean yield. In Trial 5, the rye cover crop had no effect on corn yield. The results of these trials indicate corn and soybean can be planted following a cover crop without hurting 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 2017.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage practices
170140	1	Sioux	Pioneer P25T5IR and P14570R2	30	5/12/17	140,000	Corn	No-till
170601	2	Taylor	Channel 2707	30	5/8/17	30,000	Soybean	No-till
170702	3	Henry	Pioneer P1345	30	4/21/17	30,000	Soybean	Spring field cultivate
170712	4	Henry	Pioneer P34T07R2	30	5/6/17	150,000	Corn	No-till
170818	5	Floyd	Pioneer PO157AM	30	4/24/17	32,000	Soybean	Chisel plow

Table 2. Yield from cover crop in corn and soybean trials in 2017.

Exp. no.	Trial	Treatment	Yield (bu/ac) ^a	P-value ^b
170140	1	Early maturing soybean variety (1.4) seeded after oat cover crop no-till drilled at 2 bu/ac on 10/10/16, which was killed by frost 10/30/16. Late maturing soybean variety (2.5) seeded after oat cover crop no-till drilled at 2 bu/ac on 10/17/16, which was killed by frost 10/30/16.	64 a	0.79
170601	2	10 lb/ac cowpeas, 5 lb/ac red clover, and 5 lb/ac perennial ryegrass seeded into V3 corn 6/4/17. No cover crop.	219 a 232 a	0.26
170702	3	1 bu/ac oats and 2 lb/ac turnips no-till drilled 10/6/16. No cover crop.	219 a 224 a	0.43
170712	4	1 bu/ac rye no-till drilled on 10/5/16. No cover crop.	69 a 69 a	0.22
170818	5	50 lb/ac rye applied by air into soybeans 9/1/16. No cover crop.	215 a 216 a	0.77

^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.