

## Interseeding Cover Crop using a Modified Grain Drill

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### In short...

- Establishing cover crops successfully following corn or soybean has been difficult. Interseeding may be a practical solution.
- 5 cover crop treatments were tested: radish, red clover, winter rye, oat/pea mixture, and a control of no cover crops.
- All cover crops were successfully established and had consistent growth and vigor up until two weeks of grain harvest.
- All cover crops were completely buried by the corn residue after harvest.

## What's the Question?

What cover crop species can be interseeded into v5 corn growth stage without reducing corn grain yield and still be viable after corn harvest?

## Why Does it Matter?

Wisconsin growers are increasingly interested in utilizing cover crops. While cover crop establishment is relatively easy following corn silage, small grains, and processing vegetables, establishing cover crops successfully following corn or soybean has been more difficult. Aerial seeding or over-the canopy seeding late in the growing season can be done with moderate success.

An alternative approach is to interseed cover crops into a standing corn crop early in the growing season. This management practice requires special or at least modified equipment, but can improve cover crop establishment by drilling seed rather than broadcasting. Ideally, the cover crop will establish prior to canopy closure, but then survive to the end of the growing season without creating too much competition for resources (nutrients and water) for the corn crop. Little experimentation has occurred in Wisconsin to evaluate cover crop growth when interseeded into standing corn and the impact of interseeding cover crops on corn grain yield.

## What are the Results?

Research studies were conducted during the 2014, 2015, and 2016 growing seasons at the Arlington Agricultural Research Station. Five cover crops treatments were planted into corn: (1) radish, (2) red clover, (3) winter rye, (4) oat/pea mixture (70% oats, 30% pea), and (5) no cover crop. Table 1 shows seeding depth and rates. Cover crops were drill seeded when corn was at the V4-V5 growth stage using a modified no-till grain drill (Fig. 1). The drill had four row units removed, leaving 6 row units to allow the drill to go through the crop rows and plant three rows of cover crops between each corn row (Fig. 2). The no-till disks and supporting hardware were also removed to prevent damage to the corn.

**Table 1.** Cover crop seeding rate and seed depth placement.

Cover Crop	Seeding Rate (lb ac <sup>-1</sup> )	Depth (in)
Winter Rye	120	1
Red Clover	12	0.25
Radish	12	0.25
Oat/Pea Mix	90/10	1



**Figure 1.** Modified grain drill to allow seeding into corn.



**Figure 2.** Interseeding (drilling) of cover crops.

#### Study results:

- In 2014 and 2015, all cover crops were germinated within four weeks of seeding, had consistent growth during the growing season, and had good vigor up until two weeks of grain harvest.
- In 2016, there was excellent early –season corn growing conditions and the corn out competed the winter rye and oats/pea mixture.
- Corn never showed any visible symptoms of stress and the cover crops did not significantly reduce corn yields.
- All cover crops were completely buried by the corn residue after harvest.
- Radish and oat/pea all winterkilled.
- Red clover did not survive the winter in 2014, however did in 2015 and 2016. In 2014, the red clover looked very poor at the time of corn harvest; the late corn harvest stressed the red clover too much for it to survive the winter.
- Winter rye survived the winter in 2014 and 2015.



**Figure 3.** Establishment of cover crops.



**Table 2.** Fall cover crop biomass collected after corn harvest and prior to first killing frost

Cover Crop	2014 <sup>1</sup>	2015 lb ac <sup>-1</sup>	2016 <sup>2</sup>
Winter Rye	210 (102)	487 (345)	-
Red Clover	230 (62)	513 (318)	589 (375)
Radish	904 (783)	638 (411)	161 (66)
Oat Pea Mixture	201 (205)	22 (6)	-

<sup>1</sup>Biomass weight (standard deviation in lb ac<sup>-1</sup>).

<sup>2</sup>Winter rye and oat pea mixture did not survive until grain harvest in 2016.

**Table 3.** Grain corn yield.

Cover Crop	2014 <sup>1</sup>	2015 bu ac <sup>-1</sup>	2016
Winter Rye	182	216	224*
Red Clover	180	208	240
Radish	169	196	234*
Oat Pea Mixture	180	205	242
None	184	229	249

<sup>1</sup>\* Indicates statistical significance from the untreated control.

**Table 4.** Spring cover crop biomass following corn harvest

Cover Crop	2015 <sup>1,2</sup>	2016 lb ac <sup>-1</sup>	2017 <sup>3</sup>
Winter Rye	-	1428 (500)	-
Red Clover	-	1285 (206)	303 (59)

<sup>1</sup>Biomass weight (standard deviation in lb ac<sup>-1</sup>).

<sup>2</sup>Radish and oat pea mixture winterkilled in all years.

<sup>3</sup>Winter rye and oat pea mixture did not survive until grain harvest in 2016.

## What's the Status of the Research? Are There Updates?

Interseeding continues to be a topic of interest for Wisconsin producers. Interseeding research has continued to evaluate cover crop species interseeded into corn grain, silage, and soybean. Seeding times include growth stages V5, V8, and R6 for corn and V5 and R7 for soybean. Seeding methods used include a modified no-till drill, broadcast, and simulated aerial application. The research has concluded and there are no additional updates at this time.