

INTERSEEDING COVER CROPS INTO CORN IN WISCONSIN

Daniel H. Smith, Matt Ruark, Francisco Arriaga, and Mark Renz^{1/}

Introduction

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.

Approach

Field experiments were conducted at the Arlington Agricultural Research Station. The field was fall chisel plowed and then field cultivated in the spring prior to corn establishment. Corn was planted in early June in 2014 and in mid-May 2015. 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 V5 growth stage (14 July, 2014 and 6 June, 2015) using a modified no-till grain drill. 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. The no-till disks and supporting hardware were also removed to prevent damage to the corn. Corn was harvested for grain, and following harvest cover crops were evaluated by weighing the total dried biomass collected from a 0.25 by 0.25 m quadrat in each plot.

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

Cover Crop	Seeding Rate (lb/acre)	Depth (in)
Winter rye	120	1
Red clover	12	0.25
Radish	12	0.25
Oat/Pea Mix	90 / 10	1

Results and Discussion

All cover crops were successfully established in 2014 and 2015. Within four weeks of seeding radish, red clover, and winter rye had germinated, had consistent growth during the growing season, and had good vigor up until two weeks of grain harvest. In 2015 the oat/pea did not have good vigor and had very poor biomass accumulation. Table 2 shows cover crop biomass accumulation. The corn never showed any visible symptoms of stress and the cover crops did not significantly reduce corn yields (<0.0001). Corn yields are shown in Figure 1 and 2. In 2014,

^{1/} Outreach Specialist, Dept. of Horticulture; Associate Professor and Assistant Professor, Dept. of Soil Science; Associate Professor, Dept. of Agronomy, respectively, Univ. of Wisconsin-Madison, Madison, WI 53706.

radish and oat/pea winterkilled and rye was the only cover crop that needed terminated in spring. 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. Both years all cover crops were completely buried by the corn residue after harvest and resulted in variable biomass data. Future research will focus on evaluating the soil conservation, soil carbon building, and potential N credits obtained with interseeding these cover crops.

Table 2. 2014 and 2015 Interseeded cover crop biomass following grain harvest at Arlington Agriculture Research Station.

Cover Crop	2014 Biomass (lb/acre) ¹	2015 Biomass (lb/acre)
Red clover	229(72)	511(317)
Winter rye	209(117)	485(421)
Radish	900(779)	635(410)
Oat/Pea	201(204)	21(10)

¹Biomass weight (standard deviation in lb/acre).

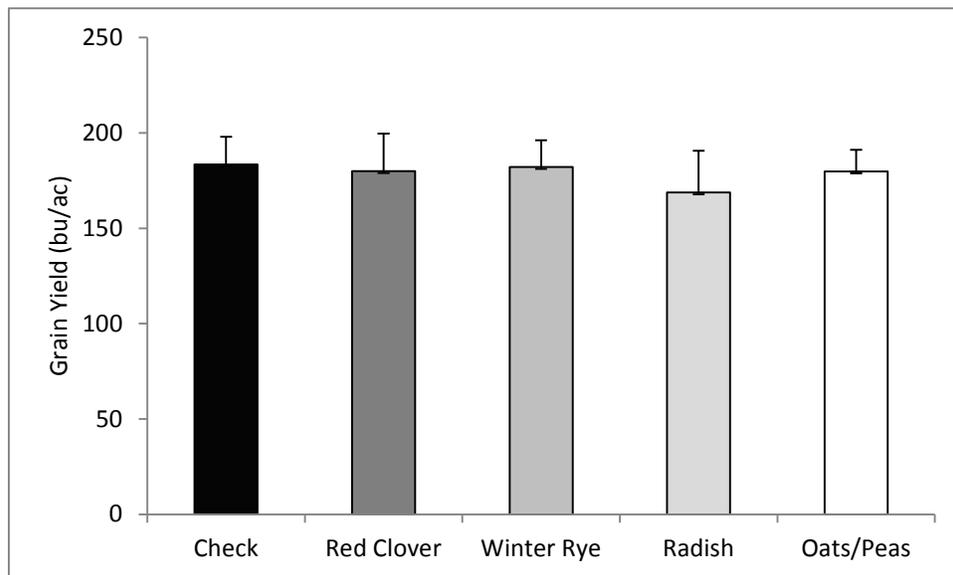


Figure 1. 2014 Cover crop interseeding corn grain yield at Arlington Agriculture Research Station.

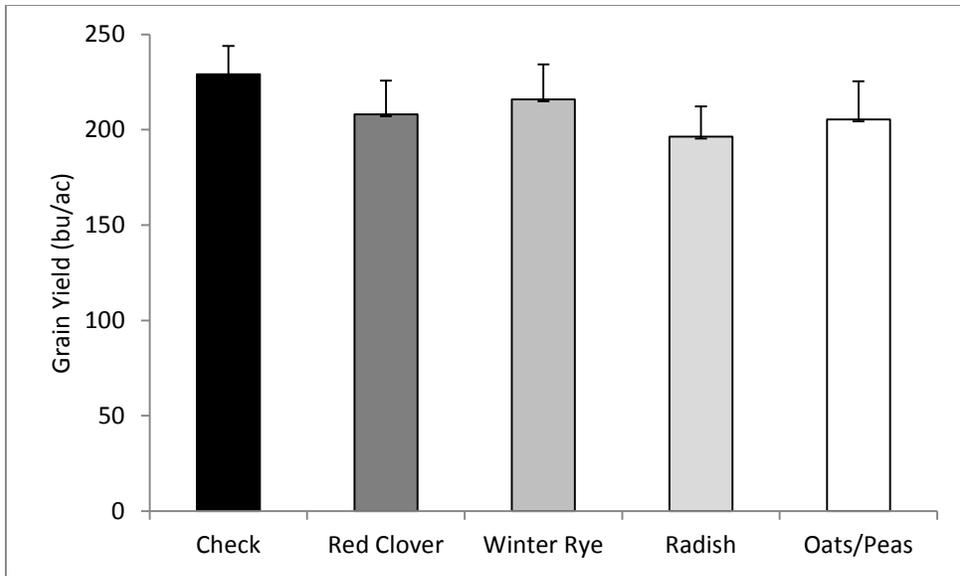


Figure 2. 2015 Cover crop interseeding corn grain yield at Arlington Agriculture Research Station.