

# Winter Cereal Rye Cover Crop Effect on Cash Crop Yield

Year 7

Iowa Learning Farms and Practical Farmers of Iowa



## Summary

**Farmers reported that in 49 of 53 site-years, properly managed cover crops had little to no negative effect on corn and soybean yield (and actually increased soybean yield in 7 site-years).**

## Cooperators

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Randy Caviness, Greenfield  
Jim Funcke, Jefferson  
Devan Green, Conrad  
Rick Juchems, Plainfield  
Rob Davis & Darwin Pierce,  
Whiterock Conservancy, Coon Rapids  
Mark Pokorny, Clutier  
George Schaefer, Kalona  
Jerry Sindt, Holstein  
Rob Stout, West Chester  
Gary & Dave Nelson, Fort Dodge  
Kelly Tobin, New Market

## Project Timeline

2008-2015 (7th year report)

This project was funded by the State Soil Conservation Committee and the Iowa Department of Agriculture and Land Stewardship. Additional outreach and education funding came from a NCR-SARE grant, Walton Family Foundation and the Iowa Learning Farms.

## Methods

- 12 sites over the course of this study with seven participating in 2015. All sites are in corn-soybean rotations.
- Cooperators establish and maintain replicated strips the length of their field for duration of the study. Each replication has one strip with cover crops and one without cover crops.
- Cooperators seed cereal rye cover crop in the fall of 2014 aerially or with a drill at seeding rates ranging between 56-84 lb/ac.
- Cover crop termination was primarily accomplished with herbicide applied prior to cash crop planting the following spring.

Table 1. Farm location, cover crop management, and cash crop for the 2014 growing season.

Location	Cover Crop planting date	Cover crop planting method	Cover crop seeding rate	Cover crop termination method	Cash crop	Planting date
Plainfield (NE Iowa)	10/29/14	Drilled	56 lb/ac	Herbicide	Soy	5/13/15
Coon Rapids (West central Iowa)	11/6/14	Drilled	60 lb/ac	Herbicide	Soy	5/22/15
Holstein (NW Iowa)	9/12/14	Aerial	60 lb/ac	Cultivated & Herbicide	Corn	4/28/15
Kalona (SE Iowa)	8/29/14	Aerial	84 lb/ac	Herbicide	Soy	5/29/15
West Chester (SE Iowa)	11/1/14	Drilled	56 lb/ac	Herbicide	Soy	6/1/15
New Market (SW Iowa)	10/9/14	Drilled	56 lb/ac	Herbicide	Soy	5/14/15
Jefferson (West Central Iowa)	10/22/14	Drilled	60 lb/ac	Herbicide	Corn	5/4/15

## Results

### Cover crop biomass

Above-ground cover crop biomass was determined at most locations at the time of cover crop termination (Table 2). Over the years, aboveground cover crop biomass at locations ranged from trace amounts to 2,407 lb/ac prior to corn and from 55- 2,475 lb/ac prior to soybeans. Cover crop was typically terminated 7-10 days prior to planting.

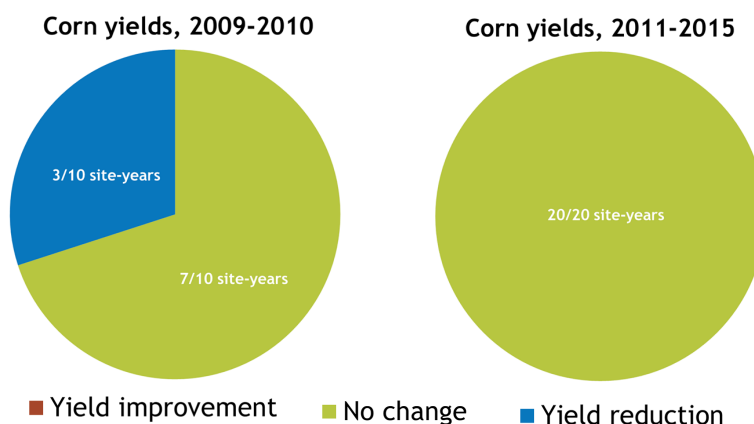
Location	Cover crop biomass (lb/ac)	Sampling date
Plainfield	695.30	5/13/15
Coon Rapids	55.24	4/22/15
Holstein	NA	Failed to Establish
Kalona	678.01	4/28/15
West Chester	317.97	5/1/15
New Market	453.47	4/21/15
Jefferson	34.80	4/28/15

Table 2. Mean cover crop aboveground biomass samples prior to termination in 2015.

## Corn yields 2015

In general, corn yields were equivalent regardless of cover crop treatment as determined by statistical analysis (t-test). Only at Jefferson (2009), Coon Rapids (2010) and Harlan (2010) were corn yields reduced in the cover crop strips. It should be noted that these instances occurred only in the first two growing seasons of the trial. Cooperators identified insufficient cover crop termination (Jefferson '09) or improper planter settings (Coon Rapids, Harlan '10) as reasons for the average yield decrease of 27 bu/ac. In the remaining cases, corn yield was not affected by the cover crop (Figure 1). At all but one location which suffered a hail storm in June, corn yields were near or above 200 bu/ac in 2014 and 2015.

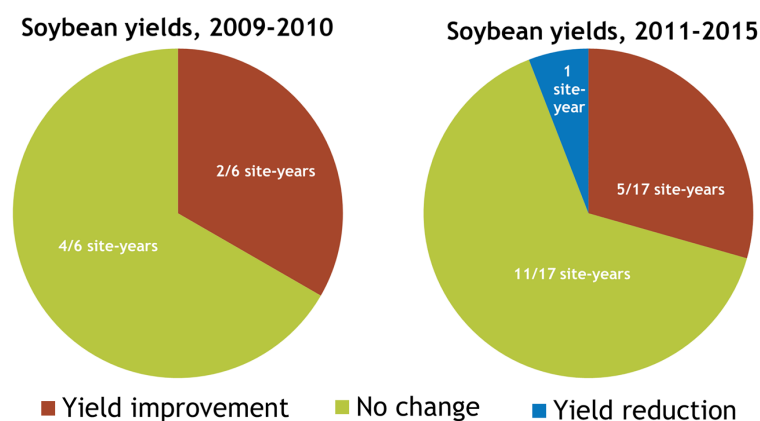
Figure 1. Trends with respect to cover crop effect on corn yields at 10 site-years from 2009 to 2010 and 20 site-years from 2011 to 2015.



## Soybean yields 2015

Soybean yields were typically equivalent regardless of cover crop treatment as determined by statistical analysis (t-test). In seven cases, however, soybean yields were improved by the cover crop. Increase in soybean yield ranged from 3 to 8 bu/ac with an average increase of 5 bu/ac in these cases. As with corn, soybean yield was also mostly not affected by the cover crop (Figure 2). Soybean yields in 2015 ranged between 41 and 63 bu/ac.

Figure 2. Trends with respect to cover crop effect on soybean yields at 6 site-years from 2009 to 2010 and 17 site-years from 2011 to 2015.



## Cover crop effect on cash crop yield trends

Since 2008, there have been 30 site-years dedicated to determining the effect on corn yields and 23 site-years to determine the effect on soybean yields. After their first year of introducing cereal rye into their operations, the farmer partners made adjustments to their planter settings to handle more residue and planned to terminate the cover crop 7-10 days before planting to minimize negative impacts on yield. After seven years in the study, the farmer partners have reported mostly no effect of the cereal rye cover crop on corn and soybean yield.

For more detailed information on the project and Year 5 report, see "Winter Cereal Rye Cover Crop Effect on Cash Crop Yield – Year 5" on these websites:

ILF: <http://www.extension.iastate.edu/ilf/content/cover-crop-research>

PFI: <http://practicalfarmers.org/farmer-knowledge/research-reports/2014/winter-cereal-rye-cover-crop-effect-cash-crop-yield/>



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