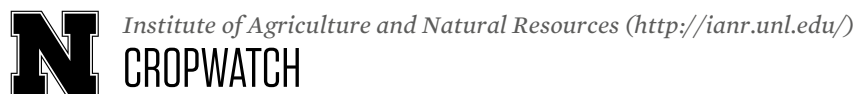


UNIVERSITY OF NEBRASKA-LINCOLN



# Impact of Cover Crops on Corn and Soybean Yield in Nebraska On-Farm Research

NOVEMBER 29, 2016

Laura Thompson - Extension Educator (<http://cropwatch.unl.edu/author/laura-thompson-extension-educator-1>) | Chuck Burr - Crops and Water Extension Educator (<http://cropwatch.unl.edu/author/chuck-burr-water-extension-educator>) | Keith Glewen - Extension Educator (<http://cropwatch.unl.edu/author/keith-glewen-extension-educator>) | Gary Lesoing - Extension Educator (<http://cropwatch.unl.edu/author/gary-lesoing-extension-educator>) | Jenny Rees - Extension Educator (<http://cropwatch.unl.edu/author/jenny-rees-extension-educator>) | Gary Zoubek - Former Extension Educator (<http://cropwatch.unl.edu/author/gary-zoubek-former-extension-educator>)

Summarized by Mary Drewnoski - Beef Systems Specialist (<http://cropwatch.unl.edu/author/mary-drewnoski-beef-systems-specialist-0>)

*This is one of several briefs on NU cover crop research (<http://cropwatch.unl.edu/2016/unl-cropwatch-december-9-2016>) featured in this week's CropWatch.*

## Background

The impacts of cover crops on subsequent grain crop production are not well documented. The objective of these experiments was to evaluate the impacts of cover crops on subsequent corn and soybean yields in various locations in Nebraska.

## Study Description

Three studies were conducted to evaluate the effects of winter hardy cover crops:

- A three-year study (Study ID 119109201101M3) to evaluate the effects of cereal rye or a multispecies winter mix versus no cover crop was conducted in Lancaster County in eastern Nebraska. The silty clay loam field was managed in a corn-soybean rotation. The cover crops were planted in mid-October of 2010 and 2011 and in late September of 2012. Cereal rye was drilled at 1 bu/ac (60 lb/ac). The cover crop mix contained winter wheat (30 lb/ac), winter peas (10 lb/ac), hairy vetch (5 lb/ac), common vetch (3.75 lb/ac), winter lentil (3.75 lb/ac), rape (1 lb/ac) and winfred turnip (1 lb/ac). The covers were terminated in mid-April and the cash crop (soybean or corn) was planted in late April.
- In 2014, another study in Lancaster County (Study ID 119109201501) was conducted to evaluate the impacts of planting winter hardy cover crops in mid-August after wheat harvest in a non-irrigated field. Two cover crops were planted: Cereal rye (1 bu/ac) and a winter mix of winter wheat (22 lb/ac), winter peas (7.5 lb/ac), hairy vetch (3.75 lb/ac), common vetch (3 lb/ac), winter lentil (3 lb/ac), rapeseed (0.75 lb/ac), and winfred turnip (0.75 lb/ac). The covers were killed in late April 2015 and corn was planted seven days later.

- A third study (Study ID 006159201401) was conducted in Seward County to evaluate the impacts of cereal rye on subsequent irrigated corn yield. The cereal rye was seeded at 40 lb/ac into soybean stubble in early October. The rye was terminated in the spring when it was 6 to 12 inches tall.

Two studies were conducted to evaluate the effects of summer cover crop mixes (that would winter kill) being planted into wheat stubble on dryland acres.

- In Franklin County (Study ID 041061201401) on a Holdrege silt loam soil, a mix of sorghum x sudangrass, rapeseed, radish, pea and hairy vetch was drilled into wheat stubble in August 2013. Soil moisture data was collected in fall 2013, spring 2014, and fall 2014. Rainfall was above the 10-year average throughout 2014, with the exception of April when rainfall was slightly below the 10-year average.
- In Clay County (Study ID 038035201401), on a Hastings silt loam soil, the mix was planted in August and included winter pea, mung bean, sorghum x sudangrass, pearl millet, oats, radish, and sunflower. Rainfall in 2014 was close to the 10-year average from January to March, below average for April and May, and above average from July through the remainder of the growing season.

## Applied Questions

**Will the use of cereal rye or a winter cover crop containing legumes affect corn or soybean yields?** In all three studies (Lancaster 119109201101M3, Lancaster 119109201501 and Seward 006159201401) planting of cereal rye did not statistically affect yield of the subsequent cash crop (corn or soybean). Similarly, in the two studies with the winter hardy mixes (both in Lancaster), no statistical differences in cash crop yields were observed.

**Will the use of summer cover crop mixes planted after wheat on dryland acres affect subsequent corn yields?** The two studies (Franklin 041061201401 and Clay 038035201401) showed a reduction in subsequent dryland corn yields. In Franklin the corn yield was reduced 10 bu/ac (158 to 148 bu/ac). In Clay, the yield drag was smaller but still significant (178 to 173 bu/ac). In Franklin soil moisture was measured in the spring and was 1.5 inches less where the summer cover crop had been planted, suggesting that the use of the moisture in the fall by the cover crop may have reduced the amount of water available for the corn crop in the spring.

**Did the addition of cover crops provide a short-term economic return?** Across all studies the extra cost of cover crops was not offset by increases in cash crop yield.

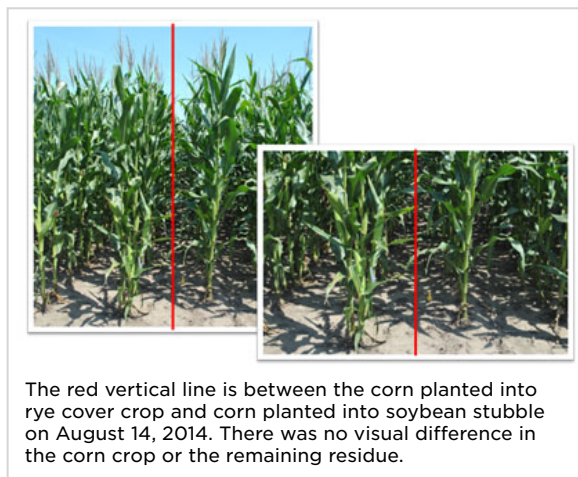


Table 1. Effect of winter hardy cover crop terminated in spring on subsequent cash crop yield