Influence of Cover Crop Planting and Termination Time on Rainfed Corn Production in Western Nebraska
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Introduction

✓ Cover crops (CC) are becoming popular across the United States. In western Nebraska, wheat-corn-fallow is the predominant rotation strategy in rainfed fields. Inclusion of CC could succeed winter wheat, filling the fallow period before corn planting (Figure 1).

✓ Benefits of CC are potential increase in soil fertility, reduced soil erosion and weed suppression.

✓ However, in dryer environments, CC can use excessive amounts of soil water, which may significantly reduce grain yield of subsequent crops. Thus, dryland producers of western Nebraska are questioning whether their adoption is justifiable.

Objective

✓ Evaluate the impact of CC selection, planting and termination time on biomass production, soil moisture levels, and subsequent corn development.

Material and Methods

✓ Three CC planting times: 3, 6 and 9 weeks after wheat harvest, represented by P1, P2 and P3, respectively.

✓ Four CC termination times:

Winter-sensitive mixture, killed in the winter (WS)
Winter-hardy mixture early terminated (3 weeks prior corn planting; WHET)
Winter-hardy mixture late terminated (at or after corn planting; WHLT)
No cover crop (NCC)

✓ Winter-sensitive mixture species: black oats, spring barley, spring lentil, and diakon radish

✓ Winter-hardy mixture species: winter barley, winter triticale, hairy vetch, and diakon radish

✓ The experiment was established at two locations in 2016 (North Platte and Grant, NE).

✓ Cover crop biomass was collected after first frost event in the Fall 2016, and twice in the Spring 2017 (3 weeks before and at corn planting).

✓ Soil volumetric water content (VWC) measurements were taken at corn planting (0 to 20 cm deep) using the Field Scout TDR 300 Soil Moisture Meter (Spectrum Technologies, Inc., Aurora, IL).

✓ Corn biomass was collected at V6 growth stage.

✓ The study was arranged in a randomized complete block design with four replications.

✓ Statistical Analysis was ran in SAS 9.4 using GLIMMIX.

Results

Cover Crop Biomass Accumulation

Figure 2. Cover crop biomass accumulation in the fall (A), early-spring (B), and late-spring (C), according to different planting times at North Platte, NE. For planting time information check Figure 6.

✓ Winter-sensitive CC mixes died in the winter; winter-hardy mixes needed to be terminated with herbicides in the spring.

✓ To optimize CC biomass in the fall, producers should plant CC shortly after wheat harvest. For CC biomass in the spring, there was a wider window to plant CC after wheat harvest.

✓ In rainfed areas, CC termination time is key to avoid excessive cover crop growth, water use and nitrogen immobilization before corn establishment.

Future Directions

✓ Soil fertility, weed counts and yield data will be collected and published in the near future. The study will be replicated in 2017-2018. Additional projects looking at wheat stubble cutting height in combination with CC at several precipitation zones across NE will help us elaborate CC management recommendations for dryland cropping systems in western Nebraska.

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Conclusions and Applications to Crop Management