Interseeding Cover Crops into Corn: How Much Will They Grow?

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Introduction

- Cover crops can scavenge excess NO_3^- in the soil and release it to the following crop as the biomass decomposes.
- In North Dakota, there is too little time between corn (*Zea mays*) harvest and the first killing frost to establish a cover crop.
- New equipment (Fig. 1) can interseed cover crops between corn rows along with a simultaneous side-dress N application up through the V8 corn growth stage.
- Interseeding cover crop seeds protects them from the environment and increases seed-soil contact for faster germination compared to broadcasting.
- Interseeding cover crops into a standing crop increases the period of time a cover crop has to produce biomass and scavenge N before the first killing frost.
- Interseeded cover crops need to survive dry, shady growing conditions underneath the corn canopy (Fig. 5). When corn is harvested beginning in October, the cover crops are exposed to full sunlight and resume growth.
- Cereal rye (*Secale cereale*) and winter camelina (*Camelina sativa*) are winter-hardy cover crop species that continue growing until the first killing frost.

Figure 1. Cereal rye (left) and winter camelina (right) interseeded between corn rows in Prosper, ND.

Objectives

- Measure the amount of photosynthetically active radiation (PAR) intercepted by corn hybrids of differing relative maturity (RM), and the subsequent effect on cover crop growth when interseeded into V7 stage corn
- Measure the effect of cover crop growth on corn yield

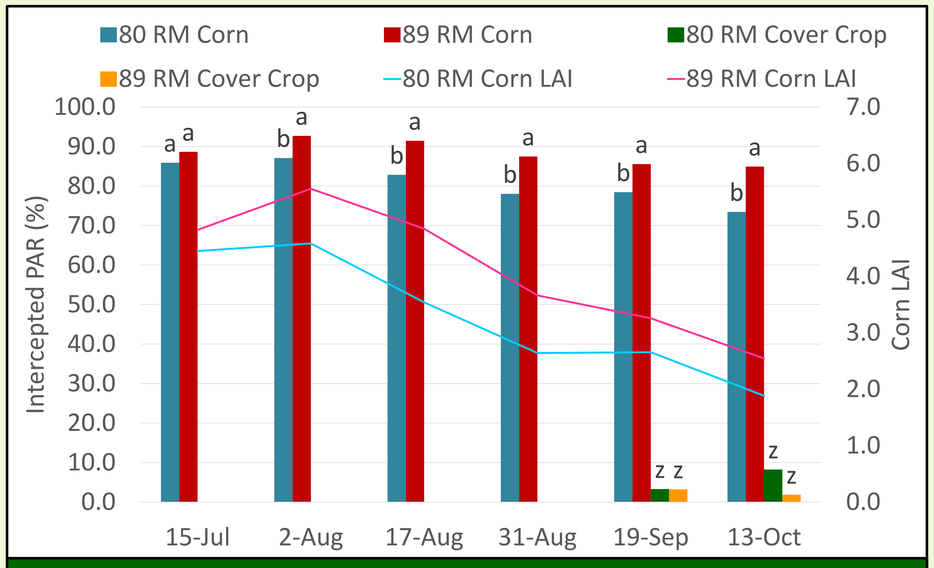

Figure 2. Percent of PAR intercepted by corn and cover crop canopies, and corn LAI at biweekly dates in Forman, ND. Cover crop is averaged across cereal rye, winter camelina, and mix treatments. Lowercase letters indicate differences between treatments within the same date at α=0.05.

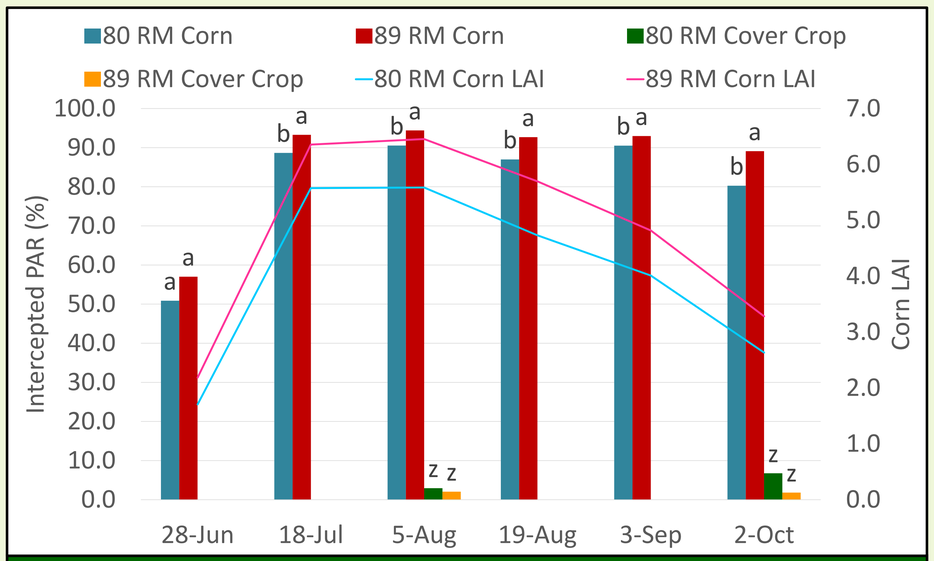

Figure 3. Percent of PAR intercepted by corn and cover crop canopies, and corn LAI at biweekly dates in Prosper, ND, in 2016. Lowercase letters indicate differences between means within the same date at α=0.05.

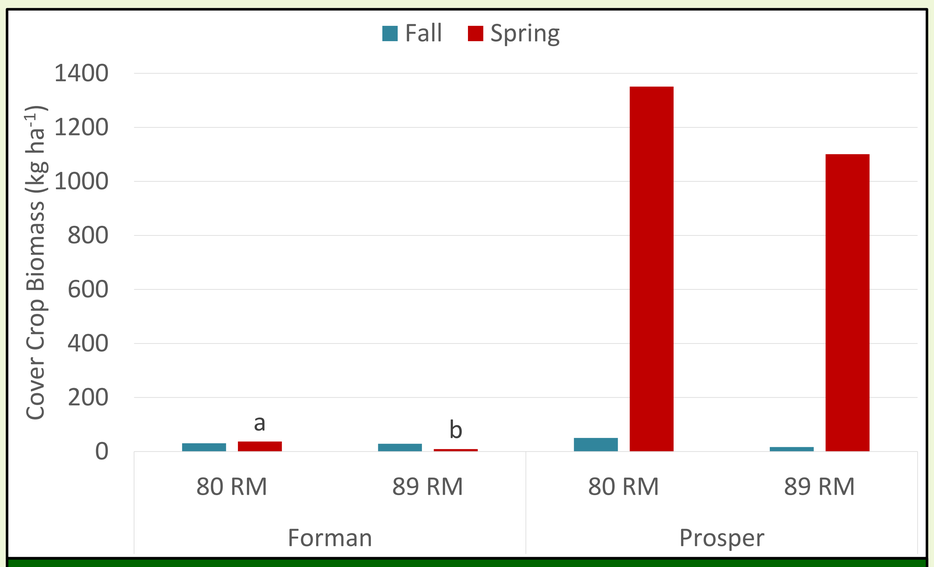

Figure 4. Fall 2016 and spring 2017 mean cover crop biomass for levels of corn hybrid RM at Forman and Prosper, ND. Lowercase letters indicate differences between means within the same location at α=0.05.

Methods

- 2016 experiment locations in Prosper, ND and Forman, ND
- Cover crops were sown at rates of 67 kg ha^{-1} cereal rye, 4.5 kg ha^{-1} winter camelina, or in a mix of 33.5 kg ha^{-1} cereal rye + 4.5 kg ha^{-1} winter camelina.
- Cover crops were interseeded with a double-bladed v-hoe with blade centers spaced 15 cm apart into V7 corn to simulate an interseeding drill (Fig. 5).
- Interception of PAR by the corn canopy was measured biweekly after cover crop emergence through corn harvest; measurement of cover crop canopy PAR interception began after cover crops grew to a measureable size.
- Cover crop biomass was sampled prior to the first killing frost, dried, and weighed to calculate biomass yield.

Figure 5. Prototype cover crop interseeder equipped for a simultaneous in-furrow side-dress N application.

Results and Discussion

- Cereal rye at Forman did not survive past emergence due to lack of rain
- Cover crops did not affect corn yield
- Hybrid RM significantly affected corn canopy PAR interception and corn LAI
- Hybrid RM did not significantly influence cover crop PAR interception (Figs. 2 & 3)
- Hybrid RM did not significantly affect fall cover crop biomass (Fig. 4).
- Spring cover crop biomass was significantly different between hybrid RMs at Forman; a non-significant but similar trend existed at Prosper (Fig. 4).
- Cover crop biomass accumulation for most treatments was minimal, except for Prosper spring biomass

Acknowledgements

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