Objective: Determine the effect of the seeding date and seeding rate of a cereal rye cover crop on groundcover, biomass production, soil health and corn yield.

Farmer-cooperator will:
- Take photos throughout the project and keep in contact with PFI with updates and questions.

Establish treatments
- Fall 2018: Drill-seed cereal rye cover crop into soybean residue on two separate dates (directly following soybean harvest vs. 10-14 days after harvest) and at two separate rates (28 vs. 55 lb/ac).

See diagram below for experimental design and how to arrange treatments in the field.
- This design results in 4 replications of 4 possible date x rate combinations:
  - Early seeding (~Oct. 15) x 28 lb/ac
  - Early seeding (~Oct. 15) x 55 lb/ac
  - Late seeding (~Nov. 5) x 28 lb/ac
  - Late seeding (~Nov. 5) x 55 lb/ac
- Strips will be as wide as at least one combine pass and run the length of the field.

Measurements
- Fall 2018: Assess cover crop groundcover just prior to hard freeze and onset of winter dormancy.
  - At three random locations within each treatment strip: lay a 16-ft length of tape measure diagonally across drilled rows of cereal rye. At every 6-in. interval, note whether there is a green plant beneath the tape (1) or not (0). This will result in 32, 1/0 readings. Summing up the 1s and dividing by 32 results in an estimate of % groundcover.
- Spring 2019: Sample aboveground biomass of cover crop just prior to termination.
  - At three random locations within each treatment strip: clip cover crop shoot material at soil level from a 0.25-m² PVC square. Samples will be dried and weighed before being sent to a lab for C and N analysis.
- Spring 2019: Corn seedling disease assessment in May/June.
  - This will be conducted at select locations by Dr. Alison Robertson, ISU Plant Pathology.
Measurements, cont.

- **Spring 2019:** Soil health assessment in late May or early June prior to any side-dress N application.
  - Collect 10 soil cores to a 6-in. depth from each treatment strip to make for one representative soil sample from each strip. Samples will be sent to AgSource Labs in Ellsworth, IA for the Solvita test (CO2-C flush following rewetting of dried soil) and Haney test soil health score.

- **Summer 2019:** Corn stalk disease assessment at maturity.
  - This will be conducted at select locations by Dr. Alison Robertson, ISU Plant Pathology.

- **Fall 2019:** Corn yields.
  - Farmers will harvest each treatment strip individually to determine grain yield and moisture. This can be accomplished with a weigh wagon or on-board yield monitor.

- **Turn in all data to Practical Farmers of Iowa at the end of the year.**

**Practical Farmers of Iowa will:**

- Help set up monitoring protocol, monitor progress of project and provide support when needed.
- Coordinate procurement of cereal rye cover crop seed in order to ensure a similar variety is used across farms for this multi-site project.
  - *To be decided:* Purchase up to $310 worth of cereal rye seed OR reimburse farmer-cooperator up to $310 for cereal rye seed purchased for use in this project.
- Publish results in a PFI research report, on PFI website, and potentially other outlets.
- Provide $550 research honorarium to cooperator upon receipt of all data collected.

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