



**RESEARCH
 PROTOCOLS**

**Interseeded Clover Cover Crops
 in Winter Cereal Rye-Corn System**

Objectives: Determine the effects on cover crop biomass production, cover crop biomass N production and yield of the succeeding corn crop of red/alsike clover that is interseeded to a cereal rye crop in spring and terminated the following spring and berseem/crimson clover that is interseeded to a cereal rye crop in the spring that winterkills.

Hypothesis: A clover mix that winterkills can produce similar results to a clover mix that overwinters, but will save the cost and labor of a burndown pass required for the overwintering clover.

Farmer-Cooperator will:

- Take photos throughout the project and keep in contact with PFI with updates and questions.

Establish Treatments

- **Spring 2019**, establish at least 4 replications of treatments as shown in the diagram below.
 - **Interseed red and alsike clover to existing cereal rye crop (Clover – overwinter)**
 - **Interseed berseem and crimson clover to existing cereal rye crop (Clover – winterkill)**
- Strips will be as wide as at least one combine pass and run the length of the field.
- **Spring 2020**, plant corn to all strips.

Measurements

- **Summer 2019**, take photos of trial progress.
 - Harvest rye grain.
- **Fall 2019**, collect aboveground biomass samples of cover crop from strips just prior to fall kill of clover and onset of hard frost (see next page for more detail).
- **Spring 2020**, collect aboveground biomass samples of clover allowed to overwinter just prior to termination (see next page for more detail).
- **Summer 2020**, take photos of trial progress; collect soil and plant samples (see next page for more detail).
 - June: collect soil samples from each strip for late spring soil nitrate test.
 - September (physiological maturity of corn): collect cornstalk samples from each strip for nitrate analysis.
- **Fall 2020**, harvest corn from each strip individually.
- Turn in all info and data pertinent to this trial to Practical Farmers of Iowa by the end of the project.

Clover – overwinter	Clover – winterkill	Clover – winterkill	Clover – overwinter	Clover – winterkill	Clover – overwinter	Clover – overwinter	Clover – winterkill
REP 1		REP 2		REP 3		REP 4	

Practical Farmers of Iowa will:

- Help set up monitoring protocol, monitor progress of project and provide support when needed.
- Publish results in a PFI research report, on PFI website and potentially other outlets.
- Provide \$550 honorarium when all data is submitted by the conclusion of the project in 2020.

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Data Collection Details

Fall 2019/Spring 2020: Collect aboveground biomass samples of cover crops prior to winter 2019 (both treatments) and planting corn in spring 2020 (clover – overwinter only).

- Collect at least one sample from each strip
- Randomly place 1'x1' PVC square in strip
 - Use shears to clip all aboveground plant material from within the square
- Place all samples from a single strip into one paper bag (e.g., one paper bag per strip)
 - Label paper bags accordingly
 - Clover cover crop termination date:
 - Clover – overwinter
 - Clover – winterkill
 - Number of squares sampled from (e.g., 3 squares = 3 ft²)
 - Date of collection
- Send paper bags to PFI office
 - Samples will be dried, weighed and sent to lab for N analysis.

June: Late-Spring Soil Nitrate Test soil sampling (corn is 6-12 in. tall)

- Collect soil cores to a depth of 12 in.
- One sample per strip.
 - Collect samples in sets of 8 cores.
 - The first core is collected in a corn row.
 - The second is collected 1/8 of the distance between any two rows after moving to another part of the sampling area.
 - The third is collected 1/4 of the distance between any two corn rows after moving to another part of the sampling area.
 - The process is continued until the eighth core is collected 7/8 of the distance between any two corn rows.
 - At least three sets (24 cores) should be collected to comprise one sample.
- For more info, consult ISU Extension and Outreach publication “Use of the Late-Spring Soil Nitrate Test in Iowa Corn Production” (CROP 3140).
 - <https://store.extension.iastate.edu/Product/5259>

September: Cornstalk nitrate testing (after physiological maturity of corn)

- Consult these resources from Iowa State University for sample collection protocols
 - <https://store.extension.iastate.edu/product/Use-of-the-End-of-Season-Corn-Stalk-Nitrate-Test-in-Iowa-Corn-Production>
 - <https://store.extension.iastate.edu/product/End-of-Season-Cornstalk-Nitrate-Testing-Video>