



## RESEARCH PROTOCOLS

### Nitrogen Credit from Clover Cover Crop in Oat-Corn System

**Objectives:** Determine the effect on corn grain yield of 100, 130 and 160 lb N/ac applied following clover cover crop seeded the previous summer (after oat harvest).

**Hypotheses:** Nitrogen fertilizer rate will have no effect on corn grain yield; clover N credit will amount to 50-60 lb N/ac.

**Farmer-Cooperator will:**

- Follow Research Protocols in accordance with Project Design, Data to Collect, Photo List and Timeline detailed below.
- Take photos throughout the project. Try to capture photos that depict the differences you observe among the treatments.
- Keep in contact with PFI with updates and questions.
- Turn in data and complete post-project survey by November 2020.

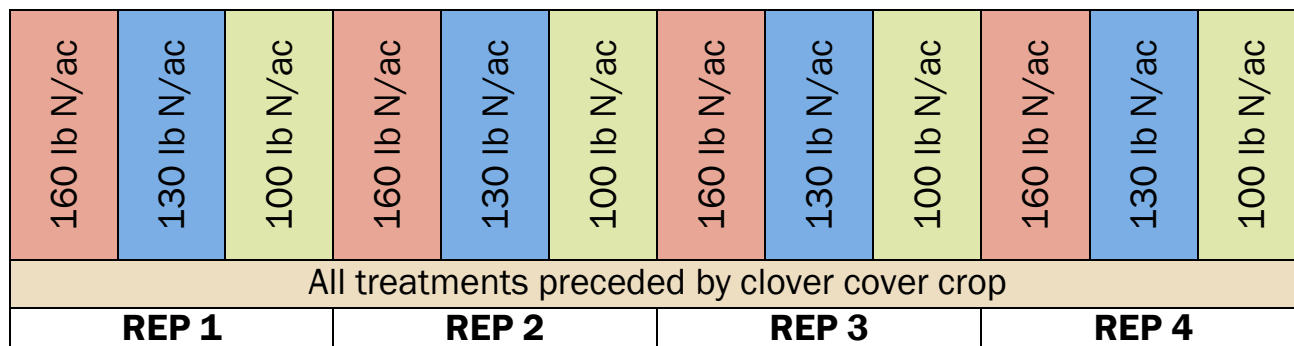
**Practical Farmers of Iowa will:**

- Help set up research 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 research honorarium to cooperator upon receipt of data.

**Project Design:**

Treatment	Description
100 lb N/ac	Apply 50 lb N/ac at corn planting + 50 lb N/ac at sidedress.
130 lb N/ac	Apply 50 lb N/ac at corn planting + 80 lb N/ac at sidedress.
160 lb N/ac	Apply 50 lb N/ac at corn planting + 110 lb N/ac at sidedress.

- Apply these three treatments in a replicated trial: at least four replications of strips.
  - 3 treatments x 4 replications = 12 strips total.
- Strips must be at least as wide as one combine pass and should run the length of the field.
  - Example layout:



**Data to Collect (cooperator):**

- Clover cover crop height OR biomass
  - HEIGHT: Just prior to termination, measure height of clover biomass.
    - From a few representative places in the field
    - Document height of clover from soil surface.
  - BIOMASS: Just prior to termination, sample aboveground biomass.
    - Randomly place 1'x1' PVC square in a few representative places in the field.
    - Use shears to clip all aboveground plant material from within the square
    - Place all material from one square into one paper bag
      - (e.g., one paper bag per square)
    - Label paper bags accordingly
      - Number of squares sampled from (e.g., 1 squares = 1 ft<sup>2</sup>)
      - Date of collection
    - Send paper bags to PFI office
      - Samples will be dried and weighed
- Corn grain yield
  - Harvest and record grain yield and moisture from each strip.
- Optional: Late-spring soil nitrate test (LSNT)
  - When the corn is 6-12 in. tall, collect soil cores to a depth of 12 in. from each strip.
    - Sample collection protocols from ISU:
    - <https://store.extension.iastate.edu/Product/Use-of-the-Late-Spring-Soil-Nitrate-Test-in-Iowa-Corn-Production>

**Photo List (cooperator):**

- Clover cover crop growing in spring (prior to termination)
- Corn growing in strips (throughout season).
  - Strips side-by-side showing any differences.
- Cooperator in field trial.

**Project Timeline:**

Summer 2019	Spring 2020	Summer 2020	Fall 2020
<ul style="list-style-type: none"><li>• Harvest oats from entire field.</li><li>• Seed entire field with clover cover crop.</li></ul>	<ul style="list-style-type: none"><li>• Sample clover cover crop (height or biomass).</li><li>• Terminate clover cover crop.</li><li>• Plant entire field to corn.</li><li>• Apply 50 lb N/ac at corn planting to all strips.</li><li>• Take photos.</li></ul>	<ul style="list-style-type: none"><li>• Apply sidedress N fertilizer rates to designated strips.</li><li>• Take photos.</li></ul>	<ul style="list-style-type: none"><li>• Harvest corn grain from each strip.</li><li>• Take photos.</li></ul>

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*The terms of this Research Protocols document are subject to the terms of the individual Research Cooperator's Memorandum of Understanding agreement with PFI. To the extent these terms may differ or conflict, the Memorandum of Understanding shall control.*