



**RESEARCH
 PROTOCOLS**

**Terminating Cereal Rye Cover Crop
 After Seeding Soybeans (Or Not!)**

Objectives: 1) Determine the effect on soybean yield and weed pressure from four cereal rye cover crop termination strategies: terminating near soybean planting; terminating at soybean emergence; terminating as the first trifoliolate leaf unrolls; not terminating the rye – allowing it to mature and drop seed. 2) Evaluate the ability of a rye cover crop to re-seed itself when the rye is left to grow with the soybeans and mature in mid-summer.

Hypothesis: Soybean yields will not be affected by cover crop termination strategy. Terminating either just after the first trifoliolate leaf unrolls (latest termination date) or not terminating the rye will result in the most cover crop biomass and least amount of weed pressure possibly reducing herbicide use and costs. Not terminating the rye will be an effective, low-cost method for re-seeding a cover crop in the same field.

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 May 2021.

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
At-plant	Terminate cereal rye cover crop at time of soybean planting.
Emerged	Terminate cereal rye cover crop just after soybeans have emerged (VE).
Trifoliolate	Terminate cereal rye cover crop after first soybean trifoliolate leaf unrolls (V1).
Self-seed	Do not terminate cereal rye. Allow to grow with soybeans, mature and drop seed.

- Apply these 4 treatments in a randomized, replicated trial: at least four replications of randomized strips.
 - 4 treatments x 4 replications = 12 strips total 16.
 - Apply these treatments by terminating cover crop **PERPENDICULAR** to the planted soybean rows.
- Strips must be at least as wide as one combine pass and should run the length of the field.
 - As with terminating cover crop, harvest will be **PERPENDICULAR** to the planted soybean rows.
 - Example layout:

At-plant	Trifoliolate	Self-seed	Emerged	Trifoliolate	Self-seed	At-plant	Emerged	Emerged	Trifoliolate	Self-seed	At-plant	Self-seed	Emerged	Trifoliolate	At-plant
REP 1				REP 2				REP 3				REP 4			

Data to Collect (cooperator):

- Cover crop biomass
 - Just prior to each termination date, sample aboveground biomass 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
 - Cover crop termination: At-plant, Emerged or Trifoliolate
 - Number of squares sampled from (e.g., 3 squares = 3 ft²)
 - Date of collection
 - Send paper bags to PFI office
 - Samples will be dried and weighed
- Weeds assessment
 - In late summer, count and record number of weeds in a 3-ft radius at seven random points along a 100-pace transect through the center of each strip.
- Soybean stand counts
 - In late summer, determine stand counts in each strip using [“hula hoop” method](#).
- Soybean yield
 - Harvest and record grain yield and moisture from each strip.
- Self-seeded cover crop
 - Fall 2020 groundcover; just prior to onset of winter dormancy.
 - At three random locations within each strip: lay a 16-ft length of tape measure diagonally. 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 2021 biomass
 - Follow instructions for collecting cover crop biomass samples described above.

Project Timeline:

Fall 2019	Spring 2020	Summer 2020	Fall 2020	Spring 2021
<ul style="list-style-type: none"> • Seed cereal rye cover crop to entire field. 	<ul style="list-style-type: none"> • Plant soybeans to entire field. • Collect cover crop biomass samples prior to terminating. • Terminate cereal rye cover crop <u>PERPENDICULAR</u> to the planted rows at designated stages. <ul style="list-style-type: none"> ○ Scout field for VE and V1 soybean stages. • Take photos. 	<ul style="list-style-type: none"> • Conduct weed assessment and soybean stand counts. • Take photos. 	<ul style="list-style-type: none"> • Harvest soybeans from all strips <u>PERPENDICULAR</u> to the planted rows. • Conduct %groundcover assessment in ‘self-seed’ strips. • Take photos. 	<ul style="list-style-type: none"> • Collect cover crop biomass samples from ‘self-seed’ strips. • Take photos. • Turn in data. • Take post-project survey.

Contact: Stefan Gailans, Research and Field Crops Director, (515) 232-5661; stefan@practicalfarmers.org

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.