Objective: Determine the effect of cereal rye cover crop termination date on corn disease pressure and corn yield. Hypothesis: Terminating the cover crop earlier (before planting corn) will reduce corn disease stress and improve corn yields compared to “planting green”: terminating the cover crop after planting corn.

Farmer-cooperator will:
- Agree to conduct trial for two consecutive years beginning Fall 2019 and ending Fall 2021.
- Follow Research Protocols in accordance with Project Design, Data to Collect and Timeline detailed below.
- Allow lab team from ISU (Dr. Alison Robertson, plant pathologist) to collect samples from site as detailed in Data to Collect 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 by November 2020 and November 2021.

Practical Farmers of Iowa will:
- Help set up research protocol, monitor progress of project and provide support when needed.
- Connect cooperator with Dr. Robertson.
- Publish results in a PFI research report, on PFI website, and potentially other outlets.
- Provide $550 research honorarium to cooperator upon receipt of data each year.
- Reimburse cooperator up to $300 for cereal rye seed used in the experiment each year.

Project Design:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 DBP</td>
<td>Terminate cereal rye cover crop 18 days before planting corn (18 DBP).</td>
</tr>
<tr>
<td>6 DAP</td>
<td>Terminate cereal rye cover crop 6 days after planting corn (6 DAP).</td>
</tr>
</tbody>
</table>

- Apply these two treatments in a randomized, replicated trial: at least four replications of randomized paired strips. 2 treatments x 4 replications = 8 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):
- Cover crop biomass
  - Just prior to each termination date, sample aboveground biomass of cover crop from each strip. This will result in two sampling dates: 4 samples for the first termination date and 4 samples for the second termination date. Send samples to PFI office to be dried and weighed.
- Corn stand counts
  - 3-4 weeks after planting corn, determine and record plant populations from each strip.
- Corn grain yield and moisture
  - Harvest and record grain yield and moisture from each strip.

Data to Collect (ISU – Dr. Alison Robertson’s lab team):
- Corn seedling disease severity, shoot height, shoot weight, radicle length and N content
  - At the V2-V3 corn stage, Dr. Robertson’s team will come to the site to collect samples from each strip.
- Soil temperature
  - Dr. Robertson’s team will install dataloggers in a few strips.
- Corn stalk rot incidence and nitrate concentration
  - At physiological maturity of corn, Dr. Robertson’s team will come to the site to collect samples from each strip.

Project Timeline:

<table>
<thead>
<tr>
<th>Fall 2019</th>
<th>Spring 2020</th>
<th>Summer 2020</th>
<th>Fall 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2020</td>
<td>Spring 2021</td>
<td>Summer 2021</td>
<td>Fall 2021</td>
</tr>
</tbody>
</table>

- Seed cereal rye cover crop in accordance with typical practice.
- Terminate cover crop at two treatment dates.
- Collect cover crop biomass samples just prior to each termination date.
- Plant corn to all strips on the same date. Apply 30-50 lb N/ac at planting.
- Be available to plan a date for Dr. Robertson’s team to collect corn plant samples.
- Take photos.
- Conduct corn stand counts from each strip.
- Apply balance of N fertilizer program at side-dress.
- Be available to plan a date for Dr. Robertson’s team to collect stalk samples.
- Harvest corn from each strip.
- Turn in data and photos.
- Take post-project survey.

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