**Objective:** Compare the two methods (double-digging and compost/mineral amendments) to reduce soil compaction and improve broccoli yield in till- and no-till beds. Control plots in till and no-till will also be compared.

**Hypothesis:** We expect double-digging to reduce compaction in the till bed, but with a high labor cost. We expect the no-till control plots to have lower compaction than the control-till plots, but do not expect to see a difference in the no-till plots with added mineral supplements.

**Farmer-Cooperator will:**
- Follow Research Protocols for study
- Take photos throughout the project
- Keep in contact with PFI with updates and questions
- Turn in all data 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 cooperator payment at conclusion of project year.

**Project Design:**
- The farmer will establish till and no-till beds.
- Each bed will have 4 control plots and 4 treatment plots (16 plots across both beds).
  - Till control: standard roto-till; transplant crop.
  - Till double-dig: Double-dig plots to 14 in., using “scoop and move” method; transplant crop.
  - No-till control: Maintain mulch over bed; use dibble hole to transplant.
  - No-till power mix: Same as no-till control but with additional compost and mineral added during transplant or broadcasted over plot.
- Penetrometer data, bulk density data, and yield data will be collected by plot.
**Photo List**
- early-season field-shot of trial
- photos of field prep process for each treatment (ex. Double digging, hole-transplanting)
- mid-season field-shot of trial
- groups of fruit during harvest, in bins, etc.
- harvest-time with farmer in the photo, in pruned and un-pruned plots
- bonus for photo of farmer entering data in the field!

**Data Collected**
- Crop production and trial design information
- Collect penetrometer and bulk density data twice during the trial: collect baseline data prior to any tilling/treatments; collect again during or just after broccoli harvest.
- Harvest data by plot: marketable fruit count, weight, number of surviving plants/plot.

**Project Timeline**

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>Review research protocol</td>
</tr>
<tr>
<td>April</td>
<td>Complete MOU and pre-project survey</td>
</tr>
<tr>
<td>May</td>
<td>Layout in fields for plots</td>
</tr>
<tr>
<td>May</td>
<td>Seed broccoli for transplant</td>
</tr>
<tr>
<td>June</td>
<td>Take baseline compaction data (penetrometer and bulk density) in each plot.</td>
</tr>
<tr>
<td>September - October</td>
<td>Keep harvest records by plot, in accordance with datasheet</td>
</tr>
<tr>
<td>September - October</td>
<td>Take final penetrometer and bulk density tests.</td>
</tr>
<tr>
<td></td>
<td>Enter data and photos (see photo shot list, above), to PFI’s google site:</td>
</tr>
<tr>
<td></td>
<td><a href="https://sites.google.com/practicalfarmers.org/research/home">https://sites.google.com/practicalfarmers.org/research/home</a>.</td>
</tr>
<tr>
<td></td>
<td>Complete post-project survey</td>
</tr>
</tbody>
</table>

**Contact:** Liz Kolbe, Horticulture and Habitat Programs Manager, (515) 232-5661; liz@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.*