

PHOSPHORUS STUDY PROTOCOL

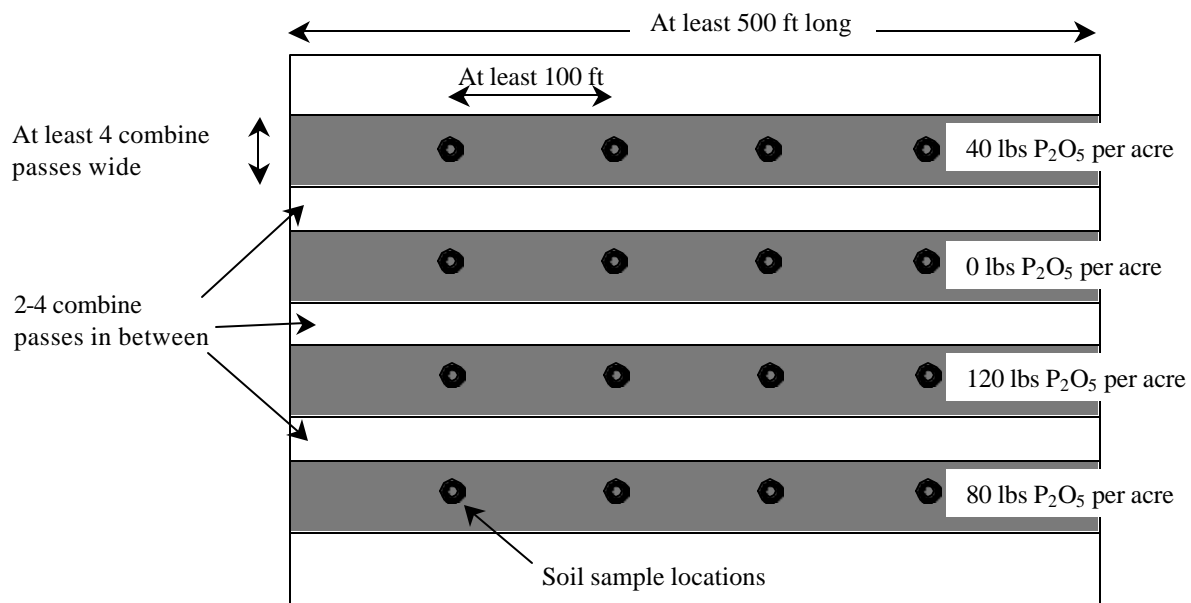
Objective:

1. Evaluate the implications of managing soil test phosphorus (STP) with the goal of achieving the greatest return given a specific time horizon for land tenure
2. Evaluate grain yield response to increased STP and / or increased fertilizer P for a specific level of STP
3. Evaluate the change in STP as a result of different amounts of P fertilizer and depending on the initial level of STP

Requirements from participants:

1. Georeferenced yield data (yield map)
2. Georeferenced soil sampling and laboratory analysis (P, K, and pH)
3. Georeferenced P fertilizer application (various rates) for selected areas within a field
4. Completed information sheet for each field (e.g., planting date, fertilizer applied, variety or hybrid, herbicides applied, etc...)

Field layout:



Expected Outcomes:

John Schmidt will provide an annual update at the precision agriculture conference in Great Bend, addressing the objectives listed above. Each participant will annually receive a copy of a written summary for the entire project.

Step-by-step procedures:

1. Identify the field or fields that you want to evaluate. The field average STP should be less than 20 ppm.
2. Select four areas (plots) within each field that are each at least 4 combine passes wide and at least 500 ft long (see diagram of field layout).
 - a. Plots can be adjacent to each other, but you probably want to allow some space (2-4 combine passes) in between them to allow for error or overlap in fertilizer application at the edges of each plot.
 - b. Each plot should be flagged when it is established so that it can be georeferenced as a polygon (width by length) or georeferenced during application. These plots **MUST** be georeferenced.
3. Collect at least 4 soil samples within each plot. Allow at least 100 ft from the edge of the field and at least 100 ft between soil sample locations; otherwise collect as many soil samples as you want. Soil samples must be collected prior to the P fertilizer application (treatments).
 - a. Soil samples should consist of 15 cores per sample (0-6 inches deep), mix well, and send about a pint of the sample to John Schmidt.
 - b. Collect the cores in a 20-ft diameter circle around the sample location. Each soil sample location **MUST** be georeferenced (one location per 15 cores). Do not georeference each soil sample core.
 - c. **Identify and label** each soil sample by farm, field, and sample number. Record this on the field information sheet with a diagram of the field and plot layout.
 - d. Each soil sample will be analyzed for P, K, pH, and buffer pH. John Schmidt will be responsible for the costs of these analyses. If you want additional analyses completed at the KSU soil lab, you will be responsible for the costs.
4. Apply four separate rates of P fertilizer in each of the four plots. The rates should be one each within the following ranges: 0, 20-40, 60-80, 100-120 lbs P₂O₅ per acre.
 - a. The cooperator is responsible for verifying the rates applied. This can be done by calibrating for the desired application rates before applying or by measuring the approximate application rates after application. Rates can be measured for liquid products by estimating the amount in the application tank before and after application.
 - b. Method for verifying rates should be documented on the field information sheet.
 - c. Phosphorus fertilizer should be tilled if you use tillage or injected in the soil for no-till systems.
5. Harvest the field with a yield monitor and GPS receiver. Determine the whole field average yield from a scale ticket. Deliver yield data to John Schmidt.

All other production practices should be uniform across the field.

If multiple crops are grown on the field, the plots should be established for the crop in which it is easiest to get the four P rates. If P is applied for any subsequent crops, it should be applied uniformly across all the plots. Any additional P application information must be provided to John Schmidt. Yield data for subsequent crops should be recorded and delivered to John Schmidt in the same manner as described.

Summary of procedures:

1. Identify a field with a field-average STP less than 20 ppm.
2. Select four areas (plots) within each field and georeference the boundaries.
3. Collect soil samples and georeference soil sample locations.
4. Apply P fertilizer treatments.
5. Continue with all other cropping practices as usual.
6. Send soil samples and information sheet to John Schmidt.
7. Collect georeferenced yield map and scale ticket for entire field. Send yield map and whole-field average yield to John Schmidt.

Contact information:

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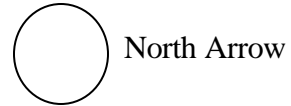
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Electronic copies of this handout can be obtained from John Schmidt. You might be particularly interested in having an electronic copy of the Field Information Sheet (following page).

Field Information Sheet (one for each field)



Farm name: _____

Diagram of Field
(include plot layout and soil sample locations with id)

Field name: _____

Soil sample identification:

Additional management information:

Date of soil sampling: _____

Crop: _____ Variety / Hybrid: _____ Planting population: _____

Planting date: _____

Starter fertilizer
(type and amount): _____

Nitrogen fertilizer
(type, amount, date applied): _____

Herbicide plan: _____

Phosphorus fertilizer:
Method of application: _____

Date of application: _____ Type: _____

Explanation of calibration: _____

Other information: _____