

Research Trial Protocol: Phosphorus Source and Rate

Updated: March 2024

Research Question: What is the influence of P fertilizer sources on crop availability and seed safety for seed-placed applications for canola production on Manitoba soils.

Rep 1	Treatment 1 (MAP – 100%)	Direction of spraying (if possible) →
	Treatment 2 (MAP – 150%)	
	Treatment 3 (Alt. P – 100%)	
	Treatment 4 (Alt. P – 150%)	
Rep 2	Treatment 2 (MAP – 150%)	
	Treatment 4 (Alt. P – 150%)	
	Treatment 1 (MAP – 100%)	
	Treatment 3 (Alt. P – 100%)	
Rep 3	Treatment 2 (MAP – 150%)	
	Treatment 3 (Alt. P – 100%)	
	Treatment 1 (MAP – 100%)	
	Treatment 4 (Alt. P – 150%)	
Check	Untreated P Check	

Direction of seeding, swathing and harvest □

Treatments

1. MAP - Standard Rate (100%)
2. MAP – High Rate (150%)
3. Alternative P – Standard Rate (100%)
4. Alternative P – High Rate (150%)

*****Standard and high rates must have equal actual lbs. P₂O₅/ac for each source*****

Include one replicated plot of untreated control to characterize P responsiveness of trial location.

Trial Design and Layout (See Plot Map)

- Randomized Complete Block
- All Treatments are replicated 3 times.
- Treatments must be randomized within each replication.
- One untreated control plot should be included to characterize P responsiveness of trial.
- Treatments should run the length of the field, excluding headlands.

Grower and Trial Location

- Must be a MCGA Member. Grower name to be submitted to MCGA for member check before trial is initiated and no later than **April 30th**.
- Must be able to adjust only seed-placed P fertilizer rates (without adjusting seed or any other nutrient rates).
- Trial should be placed in field with **Olsen P levels <10 ppm**. Grower should not be applying additional P to the field other than seed-placed P.
- Place trial in relatively uniform portion of a field, avoiding major landscape changes, headlands or areas with changes in past management history.
- Legal Land Description and GPS Coordinates of first plot to be set to MCGA no later than **June 15th**.
- Farmer Research Agreement must be signed and returned to MCGA no later than **July 31st**.

Data Collection (Excel Data Collection File Provided by MCGA)

1. Soil Sample

- a. One composite sample in the spring from entire trial area (min 15 cores)
- b. 2 Depths: 0 - 15 cm (0-6") + 15 - 60cm (6-24")

- c. All soil samples sent to Agvise Laboratories:
 - i. Label with Contractor Name and Trial ID
 - ii. Analysis: **F2 (Complete) AND Texture**
 - iii. Billed to MCGA Account (**MA1258**)

2. Plant Counts

- a. Plant counts from 5 locations in each plot at 3-4 leaf stage.
 - i. Count all plants present in **1m row length at each of the 5 locations per plot.**
 - ii. Record row spacing along with count data in excel data file.

3. P Uptake Samples

- a. Rosette (just before bolting) – All above ground biomass in 1 m² from each plot
- b. Weigh samples
- c. All tissue samples sent to Agvise Laboratories:
 - i. Label with Contractor Name, Trial ID and Plot Number.
 - ii. Analysis: Individual Plant Analysis **Total-P**
 - iii. Billed to MCGA Account (**MA1258**)

4. Yield (Grain Weight and Moisture) and Sample:

- a. **Weigh all grain from a single combine pass down the center of each plot**, the same combine must be used to harvest the entire trial.
- b. Use a calibrated weight wagon or grain cart to collect plot grain weights. Sensitivity must be <50kg on grain carts.
- c. **Record harvested area for each plot** (combine width, plot length, acres)
- d. **Moisture content is required for each plot**, place 0.75 – 1 kg of seed from each strip in a sealable plastic bag and keep cool until moisture reading can be taken (within 3 days of harvest)
- e. Samples can be discarded after moisture measurement.

5. Weather Data

- a. Growing season (Apr – Sept) daily rainfall and temps acquired from closest MB Ag weather station. Link to website in excel file.

6. Observational Data

- a. At each field visit to the research trials take note if there is any major insect pressure/damage, frost events, weed control issues, disease pressure or lodging. Take pictures to capture issues as required.
- b. Record most likely yield limiting factor at trial location.

Field Operation Records

The following information is to be collected for each trial (enter into Excel Data Collection File)

- Previous crop
- Pre-seeding tillage (implement, # passes, timing)
- Seeding equipment (type, row spacing, opener type and width)
- Seeding Date
- Variety and TKW
- Seeding rate
- Seed treatments and/or inoculants
- Fertilizer applications other than seed-placed P (rates, placement, timing)
- Herbicide (product, rate, date, crop stage)
- Fungicide (product, rate, date, crop staging)

- Desiccant (if applicable, product, rate, date, crop stage)
- Swathing date (if applicable)
- Harvest date
- Harvest method (combine, grain cart/weight wagon)

General Trial Management

Seeding

- The same variety from the same seed lot should be used throughout the entire trial.
- Use a consistent seeding rate, seed depth, and seeding speed for the entire trial.
- Seed each N treatment in all replications, adjust rate and repeat.

Fertility

- All nutrients other than P must remain at a similar rate for the entire trial to avoid confounding factors.

Pesticide applications

- Spray pest control products (herbicides, fungicides, and insecticides) across the entire trial as needed similar to the remainder of the field.
- Travel perpendicular to treatments, if possible, to ensure wheel tracks are consistent across all treatments. If not possible ensure that sprayer tracks are evenly distributed amongst areas to be harvested for trial yield calculation in each plot.

Swathing and Harvest Management

- If swathing, target 60% seed color change or if there's differences in maturity between treatments, you can: (1) Swath treatments as each treatment is ready to swath (multiple trips to the trial with swather), (2) Swath treatments when the last one has reached 60% seed color change (one trip)
- Minimum harvest length is 1000 ft
- When swathing, mark the swath that represents each plot with a flag that identifies which treatment it is.
- Each strip must be weighed individually (E.g. 3 treatments x 4 reps = 12 weighs)
- Harvest all strips on the same day, when possible, if two days are needed harvest all strips within a replicate on the same day.
- If desiccating target an application timing of 90% seed color change

*****All Data must be returned to MCGA by Sept 30*****

Payment: See Research Agreement for Payment Schedule and Invoicing Information for Agronomist Research Contractors. Payment for farmers will be mailed out upon MCGA receiving approved harvest data.

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