

eFields

Ohio State University Extension Corn Response to In-furrow Starter Fertilizer

Study Overview

The goal of this study is to determine corn's response to in-furrow (pop-up) fertilizer application. Starter fertilizer treatments will include orthophosphate and polyphosphate. Additional products i.e. micronutrient products can be added in addition to phosphorous products as separate treatments. Information from this trial will provide growers with corn's response to ortho- and polyphosphate products when used in-furrow. This information may be used to improve in-furrow starter fertilizer recommendations for growers throughout the state. Treatments should at least include an untreated check, polyphosphate treatment, orthophosphate treatment.

Proper experimental design is important to ensure the validity of season-end yield results. Plot replication and randomization make it possible for statistical analysis to account for the natural field variation that occurs. For this study, a minimum of three replications should be used with four replications recommended. Plots should be randomized within each replication to eliminate bias due to plot order.

Selecting In-furrow Starter Products

- A total of 3-4 treatments are recommended replicated no less than 4 times.
- Select an ortho and polyphosphate product
- Fertilizer rates should be appropriate for farmers soil type to avoid salt injury.
- Example treatments (balanced for P rate) include:
 - Control – no in-furrow product application
 - 3 gal/ac 9-18-9 (orthophosphate product)
 - 1.5 gal/ac 10-34-0 (polyphosphate product)
 - 1 gal/ac 28% UAN

Example: Product examples can include 10-34-0 for a polyphosphate product and 9-18-9 orthophosphate product.

Field Dimensions

The field size will determine the total number of plots that can be installed. Remember, at least 3 replications per rate. Plot length is typically determined by the length of the field. All plots should be at least 500 feet long. Plot width will be determined by equipment size. It is important to take into account the size of both the planter and the combine, as well as any application equipment that might impact the trial.

- Full-width or half-width (split-planter) planter width is recommended for a plot width. It will depend on the width of the planter plus the planter's ability to independently control rates if a split-planter setup is selected).
- Estimate the field width then divide by the selected width (full- or split- width) to determine the number of passes / plots available and if you can meet the 4 treatments by 3 replications (15 plots).
- Passes / plots no less than 500-feet (not counting headland rows) are recommended.

Suggestions

- To maximize learnings, at least 2 fields per county is recommended.
- Evaluate planter and combine width to make sure the selected plot dimensions align properly. Correct alignment of the planter and combine widths will ensure project success.
- Using the variety tracking option within an in-cab display can help managed the project. One can setup the 4 treatments by using the product name then adding A, B, C, D or E (or similar nomenclature) at the end of each name.
 - Before starting each pass, select the treatment corresponding to the plot.
 - Example help guide for the Precision Planting 20/20 display illustrating how to create custom varieties for a project:
https://fabe.osu.edu/sites/fabe/files/imce/images/Precision_Ag/PP20_20_Adding_CustomHybrid_0.pdf

Data Collection

5 primary data needs for this project

1. Complete worksheet
2. Field boundary (lat/long of field will work at minimum)
3. As-planted data (if available)
4. Final stand
5. Yield Monitor Data (calibrated); If a yield monitor is not available, a weigh wagon can be used to weigh the total amount harvested from each plot. Accurate plot dimensions are needed (e.g. width and length of each plot)

Final Stand

Stand counts should be conducted for each plot to determine the final plant stand. Find a representative location within each plot and collect final stand data.

- **Count and record the number of plants in 30 linear feet along two adjacent row**

Example Layouts

Plot layout with 4 replications using a control of 0 gal/ac (C), 3 gal/ac 9-18-9 (OP), 1.5 gal/ac 10-34-0 (PP), & 1 gal/ac 28% UAN (N) applications as treatments.

Planter Pass	Replication	Plot ID	Description	TRT Code
1	1	101	PP	C
2		102	OP	B
3		103	N	D
4		105	C	A
5	2	201	N	D
6		203	OP	B
7		204	C	A
8		205	PP	C
9	3	301	C	A
10		302	N	D
11		303	OP	B
12		305	PP	C
13	4	401	N	D
14		402	PP	C
15		403	OP	B
16		405	C	A