

eFields

Ohio State University Extension Soybean Seeding Rate Trial Protocol

Study Overview

The goal of this study is to determine the yield impact of various soybean seeding rates in Ohio. Information from this trial will be used to improve management recommendations for growers throughout the state. To maximize learning, a minimum of five different seeding rates should be compared. More rates can be added, if adequate space is available. The seeding rates compared in the trial need to be different enough to have a potential effect on yield; a minimum difference of 40,000 seeds/acre between each treatment is recommended. It may be necessary to adjust these seeding rates slightly based on your equipment capabilities.

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 Seeding Rates

- A total of 5 seeding rates is recommended replicated no less than 3 times with 4 or 5 replications ensuring a successful study.
- Increments between selected treatment rates should be no less than 40,000 seeds/ac apart.
- Determine the farmer's seeding rate for the selected variety and use as one of the middle rates.
- Select rates above and below using the 40,000 seeds/ac minimum increments and make sure the farmer is comfortable with final rate treatments.

Example: Farmer plants Variety A at 160,000 seeds/ac. Suggested rates could be 80k, 120k, 160k, 200k, & 240k seeds per acre.

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 5 treatments by 3 replications (15 plots).
- Passes / plots no less than 500-feet (not counting headland rows) are recommended.
- Plots widths should consist of **three** or more combine header widths.

- For soybeans, it is important to be aware that field activities, including harvest, may not be conducted parallel to the row direction. Wider plots are necessary to account for this.

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 5 treatments by using the variety 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 rows.**

Example Layouts

Full-width planter layout with 4 replications using 80k, 120k, 160k, 200k, & 240k seeds per acre as treatments.

Planter Pass	Replication	Plot ID	Description	TRT Code
1	1	101	200,000	D
2		102	160,000	C
3		103	240,000	E
4		104	80,000	A
5		105	120,000	B
6	2	201	240,000	E
7		202	120,000	B
8		203	160,000	C
9		204	80,000	A
10		205	200,000	D
11	3	301	80,000	A
12		302	240,000	E
13		303	120,000	B
14		304	160,000	C
15		305	200,000	D
16	4	401	240,000	E
17		402	160,000	C
18		403	200,000	D
19		404	80,000	A
20		405	120,000	B