

Effect of Seeding Rate on Soybean Yield – How Low Can We Go?

CFAES

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Introduction

- Soybean seed cost in Ohio (per 1,000 seeds, treated) has increased 20% in the past ten years (Ward, 2022).
- Lowering seeding rates may be an opportunity for Williams County soybean growers to increase profitability by reducing total seed costs.
- On-farm trials were conducted in 2019, 2020, and 2021 in Williams County to determine if seeding rates less than 200,000 seeds/acre would significantly lower yield.



Figure 1. Stand assessment at V3 – V4 growth stages, July 26, 2019, Montpelier, Ohio.

Research Objectives

- Understand the yield impact of varying soybean seeding rates.
- Determine the economic and agronomic optimal rate for Williams County, Ohio.

Research Hypothesis

Lower seeding rates will not significantly impact yield and will maximize profitability.

Materials & Methods

- Seeding rates ranging from 80,000 – 240,000 seeds per acre were compared in 2019, 2020, and 2021 in Williams County, Ohio.
- Trials were organized in a randomized complete block with 3 – 4 replications.
- Stand counts were taken 4 – 6 weeks after planting for each plot to determine final stand.
- Plot yields and moistures collected with a calibrated yield monitor.
- R (R Core Team, 2021) and *lme4* (Bates et al., 2015) were used to perform a linear mixed effects analysis of the relationship between seeding rate and yield.
- Year and block nested in year were treated as random effects. P-value was obtained by likelihood ratio test.
- Return above seed cost was calculated using a seed cost of \$0.432/1,000 and price of \$12.00.

Results

Seeding Rate Did Not Significantly Affect Yield

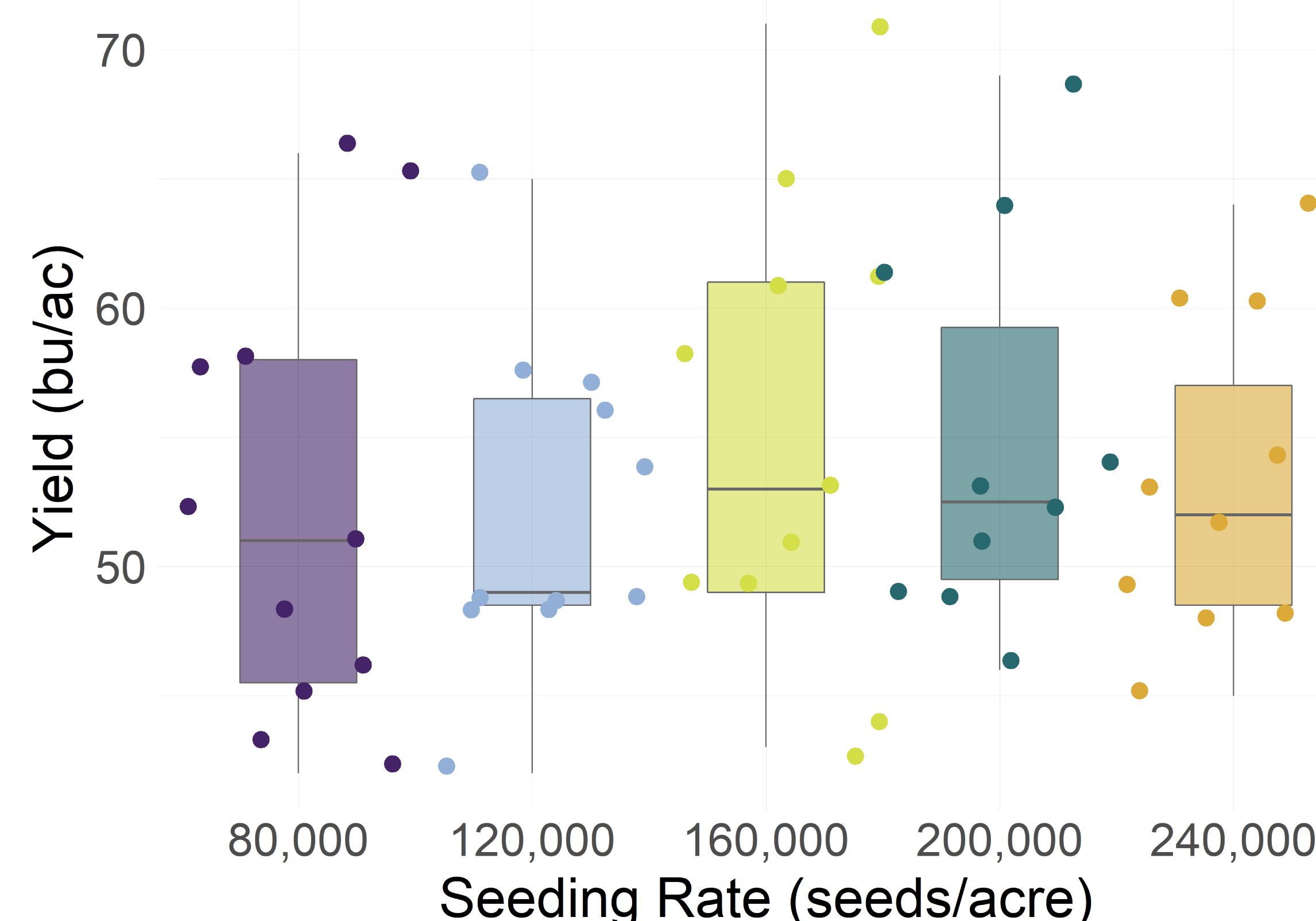


Figure 2. Final soybean yield (bu/ac). P-value = 0.08.

Greatest Return with Lower Seeding Rates

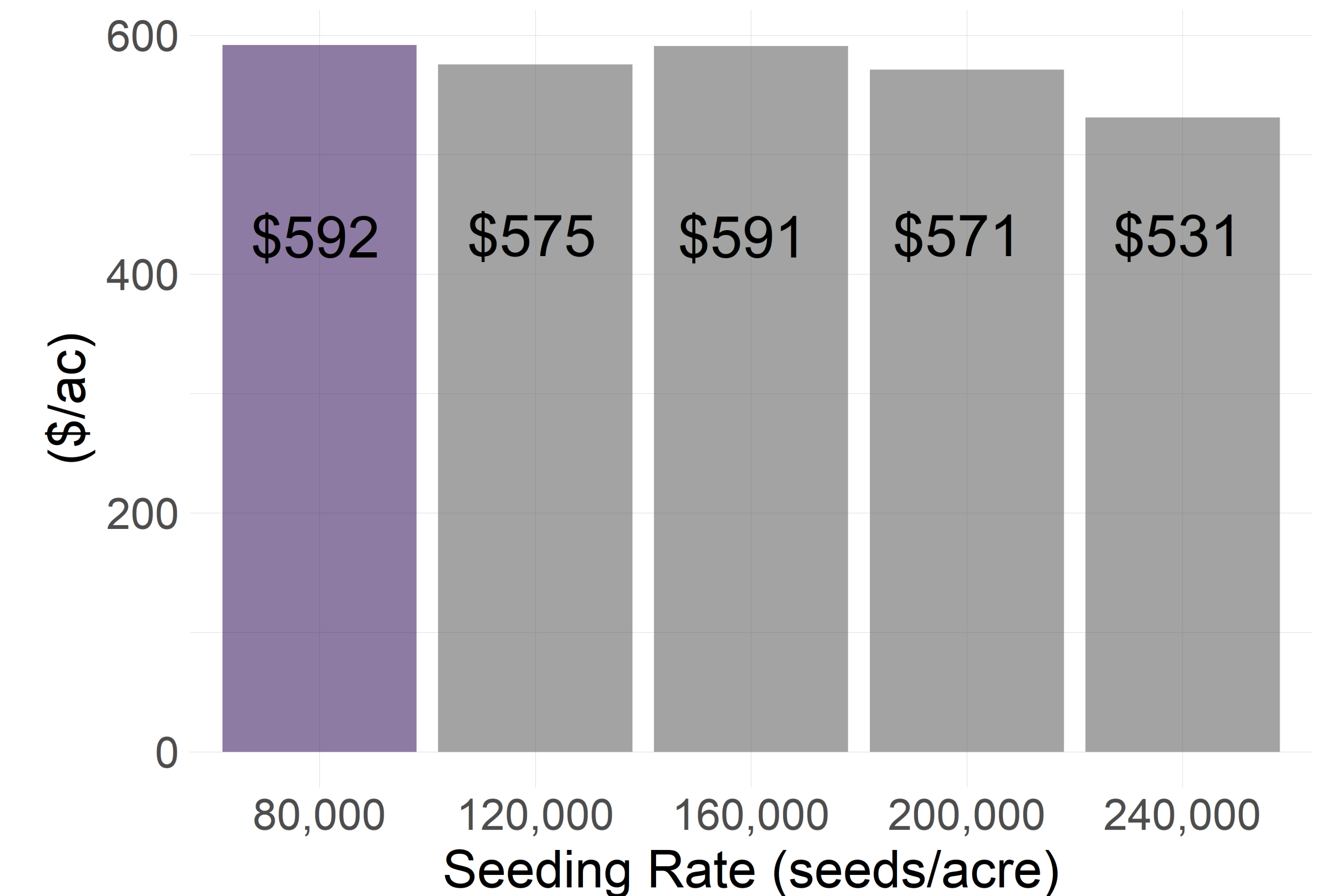


Figure 3. Return above seed cost (\$/ac).

Conclusions

- 80,000 – 160,000 seeds per acre had the greatest return above seed cost.
- Growers can lower seeding rates to increase their return but should aim for a final population of 100,000 plants per acre to achieve maximum yield (Barker et al., 2017).
- These data will also improve replant decisions and variable rate seeding prescriptions.

Acknowledgements

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References

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- **R Core Team. 2021.** <https://www.R-project.org/>.
- **Ward. 2022.** <https://farmoffice.osu.edu/farm-management/enterprise-budgets>.