

Nebraska Soybean Board
Year-End Summary Research Report Form for Multi-Year Projects

REVIEWED
By Lois Ronhovde at 2:17 pm, Nov 08, 2022

Please use this form to summarize the practical benefits of your research project and what has been accomplished. Your answers need to convey why the project is important and how the results will impact soybean production.

Note that this form must be submitted with the 4th Quarter Report in all multi-year projects.

Project # and Title: #711 Developing an approach to guide nitrogen fertilizer application in soybean

Principal Investigator: Patricio Grassini

Year of Multi Year: 2 of 3 (example: Year 1 of 3, Year 2 of 2)

1. What was the focus of the research project?

The focus of the research project is the fine tuning of nitrogen application in soybean.

2. What are the major findings of the research?

During 2021 & 2022 we conducted replicated field experiments across 41 farmer fields (23 in 2021 & 18 in 2022). These fields were selected based on previous evidence of high yields (80+ bu/ac) and good agronomic management (e.g., early planting date). Each experiment included three treatments: "full N" (receiving periodic applications of N fertilizer to avoid any N limitation), "zero N" (no fertilizer N was added), and "optimal N" (receiving 70 lbs N/ac around flowering). Preliminary results derived from analysis of the 2021 data indicated that the yield loss due to N deficiency, estimated as the differences between the full and zero N treatments, was 9 bu/ac, ranging from zero to 24 bu/ac. However, crop yield response to an application of 70 lb N/ac at flowering ("optimal" N) was larger than the break-even yield (2-3 bu/ac) in one third of the fields. We are collecting detailed data on plant N concentration during the season, drone imagery and other ancillary data to help us develop a method that can help predict when a field is likely to exhibit a cost-effective yield response to N fertilizer at flowering.

3. Briefly summarize, in lay terms, the impact your findings have had, or will have, on improving the productivity of soybeans in Nebraska and the U.S.

Findings from this study will be used to develop a decision tree that can help NE producers to make decisions on soybean N fertilizer application, providing them with a range of possible economic outputs considering typical fertilizer & soybean prices.

4. Describe how your findings have been (or soon will be) distributed to (a) farmers and (b) public researchers. List specific publications, websites, press releases, etc.

A crop season report was provided to farmers and other collaborators each year. Preliminary results have been presented at the annual Nebraska On-Farm Research Meeting and at the Soybean Management and Diagnosis Clinic. Additionally, results will be presented at the 2022 annual ASA/CSSA/SSSA meeting held in Baltimore, MD on Nov 6-9. It is expected that by the end of the study the results will be published in high-impact peer-review research journals and produce Extension CropWatch or NebGuide articles.

5. Did the NE soybean checkoff funding of your project, leverage additional State or Federal funding support? Please list sources and dollars approved.

No other funding support was secured for this project so far but we plan to apply for funding from NSF and USDA during 2023 to continue our research on N in soybean after the end of the third year of this project.

Please submit this completed form to the Agriculture Research Division, jmcmahon10@unl.edu, based on the reporting schedule given to you. If you have any questions, please call Jen McMahon at the Agricultural Research Division (402) 472-7082.

Please check your information before submitting the form.

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