Nebraska Soybean Board
Year-End Research Findings Report

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 impact soybean production.

Project Title: Fungicide Resistance in *Rhizoctonia solani* and Implications for Soybean Fields in Nebraska

Contractor & Principal Investigator: Sydney Everhart, Department of Plant Pathology, UNL

Please check/fill in appropriate box: ☐ ***Continuation research project***
■ ***Year 1 of 3 research project (for example: Year 1 of 2)***

1. What was the focus of the research project or educational activity?

This is a collaborative research project between the Everhart and Adesemoye labs. Two doctoral students under our mentorship are conducting these research projects. The focus of our research is to characterize the soilborne seedling pathogen, *Rhizoctonia*, using molecular techniques and fungicide sensitivity assays in order to provide recommendations to growers on how to manage this pathogen.

2. What are the major findings of the research or impacts of the educational activity?

This research is currently underway. In 2015 (pre-funding) and 2016, we collected diseased seedlings from farmer soybean fields throughout the soybean production areas in Nebraska (a geographic distribution of more than 24,500 square miles). We processed more than 650 soil and seedling samples, developing new protocols. To date, our efforts have created a collection of 23 *Rhizoctonia* spp. that are being used for further analysis as described in our research proposal. Using ITS sequencing, we determined isolates from 2015 were predominantly *R. zeae*, and in 2016 predominantly were AG5 and *R. zeae*. To confirm that all isolates were pathogenic on soybean, a rolled towel laboratory assay was used on each isolate. Scoring of these groups for pathogenicity is currently underway. This is the first comprehensive research study of *Rhizoctonia* on soybean in Nebraska.

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.

What are healthy soils? Research in the Everhart and Adesemoye labs on Rhizoctonia are laying the foundation for improved soilborne pathogen disease management. This is the first research to robustly investigate diseases caused by *Rhizoctonia* on soybean in Nebraska. By understanding where and why soilborne diseases occur and possible problems with fungicide resistance, we will develop recommendations on how farmers can achieve optimal soil health. This is in light of the fact that there are few ways to otherwise reduce pathogens in the soil.

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.

In January 2016, we provided information to growers during the Crop Production Clinic on *Rhizoctonia* diseases as well as updates from this project. Additionally, we spoke about Rhizoctonia diseases in soybean during a tour of West Central Research and Extension Center, North Platte by leaders and administrators in the region on May 27, 2016, and during a university course visit on August 17, 2016. In addition to formal presentations, Dr. Adesemoye provided one-on-one consultation to farmers specifically regarding Rhizoctonia disease management.

*****This form must be completed and submitted with the fourth quarter report.***

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Publications and scientific presentations:

Adesemoye, A.O., S. Kodati, and R. Werle. 2016. Herbicide Injury and Pathogen Infection on Soybean Seedlings. *CropWatch* June 17, 2016

Kodati, S., and A.O. Adesemoye. 2016. Characterization, Anastomosis Grouping and Pathogenicity of *Rhizoctonia solani* on Multiple Plant Hosts in Nebraska. *Department of Plant Pathology Seminar Series.* Nov. 7, 2016.

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5. Did the NE soybean checkoff funding support for your project leverage any additional state or Federal funding support? (Please list sources and dollars approved.)

J. Bond, S. Everhart, et al. (15 CO-PI's; 9 states) – Title: **Seedling Diseases: Biology, Management and Education.** Funding agency: North Central Soybean Research Program (sub-award), #SIU Carbondale 16-13. Funding to Everhart and Adesemoye as equally contributing CO-PI's in the amount of $36,000. Active dates: 10/1/2015 to present.

*****This form must be completed and submitted with the fourth quarter report.***