Nebraska Soybean Board

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VB   11/2/2017

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: Genetic Mapping of Yield Stability Genes

Contractor & Principal Investigator: Dr. David Hyten

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?**

The purpose of this research project is to discover regions in the soybean genome that contain genes that affect the ability of a variety to have consistently high yields across large geographical growing regions. This project will also focus on determining the best methods in a breeding program for early selection of these genes that enhance yield stability across a large growing area.

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

The quantifiable goal of this project is to provide molecular markers for yield stability genes that can be utilized in a breeding program, and provide a better understanding of the genetic basis of yield stability.

Thus far in the project, we have completed sequencing of the 213 advanced lines and collected basic agronomic and descriptive information from the first year of yield trials. Initial analyses with this subset of data will begin early in year 2 to help us complete the above objectives.

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.**

A key factor to releasing a new cultivar is that the experimental variety has consistent high yields across a large geographical region. Many experimental varieties are eliminated in advanced yield trials because they may yield at the top of some yield tests but near the bottom of other tests. This ability to consistently yield across diverse environments is likely due to yield stability genes.
• Yield stability genes could lead to more consistent and predictable yields.
• Incorporating yield stability genes early in a breeding program in combination with high yielding genes will help accelerate genetic gain because fewer advanced lines will be eliminated due to inconsistent yields across geographical areas.

In addition, the sequencing data of these 213 lines will serve as a valuable resource for future projects beyond the current project. Those future project will be able to focus on screening this population for additional traits without the additional cost of collecting genotype data. The genotype data can also be used to quantify the amount of genetic diversity within a large portion of the UNL soybean breeding program and to look for regions where diversity is low due to intensive selection.

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.**

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

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Our lab has continued to give tours to a variety of local, national and international groups, providing information to a range of attendees about the nature and importance of our work and this project. This spring the graduate student involved on this project collaborated with Dr. Jamie Loizzo in the UNL Ag Communication department to participate in the "Streaming Science" venture. This culminated in a short video cast that has been posted on the UNL YouTube page discussing the importance of graduate work, science in general, and specifically highlighting this project. The video can be found at this link:
https://youtu.be/IoI8R5NyEo4

An interview with Dr. Hyten was also published in UNL Strategic Discussions for Nebraska 2017 edition Big Data page 94 where he talks about researching yield stability and how this could benefit Nebraska soybeans.

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.

No

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