

Nebraska Soybean Board

Year-End Summary Research Report Form For Multi-Year Projects

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: Enhancing soybean germplasm through biotechnology

Principal Investigator: Tom Elmo Clemente

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

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

This program is introducing novel genetic variation through the tools of biotechnology, genome editing and/or the addition of a transgenic allele(s), in a build-test-learn approach, as a means to develop valuable traits that can help protect yield or improve value of the harvest.

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

The program has identified an RNA interfering approach to mitigate aphid predation. Continues to investigate genetic designs that will impact harvest index and boost oil level in the seed without compromising protein quantity. In addition, genetic designs have successfully edited two seed storage proteins SAM22 and P34, which lead to improve protein quality of the harvest. Moreover, we have developed soybean-based feedstocks suitable for the aquaculture industry to displace fishmeal and fish oil in aquafeeds, and are designing a soybean with co-products useful for the plant-based food patty market.

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.

The outcomes of this program will lead to soybean germplasm with novel genetic variation targeting various input and output traits that can complement soybean breeding programs seeking such variation that has not be identified in the breeding population of the crop to date.

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.

The results of this program are communicated in peer review research journals, and to producers through various Agriculture centric portals, along with public outreach efforts to the community through oral presentations. Although the latter has been limited since February 2020 due to pandemic

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

This program is complemented though funding provided through the United Soybean Board, and we are currently developing a multi-institutional research proposal to be considered for funding by the National Science Foundation, and the data and novel soybean germplasm (edited seed storage protein lines) will form the basis if the grant.

Please email 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 ARD 2-7082.