INNOVATION GRANT PROGRESS REPORT

PROJECT TITLE: Corn trial teaching tool and ag research at SMSU
REPORTING PERIOD: August update
FARMER INNOVATOR: N/A. University research project
COLLABORATING ORGANIZATION/PERSON: Dr. Adam Alford, Plot coordinator, Assistant professor of agronomy at Southwest Minnesota State University
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1.) PROJECT ACTIVITIES COMPLETED DURING THE REPORTING PERIOD. (*Describe project progress specific to goals, objectives, and deliverables identified in your project proposal.*)

The 2.5 acre plot was spread with 160-60-60 on 5/5/21 and incorporated on 5/7/21. Planting took place and finished on 5/11 and consisted of 9 varieties replicated 7 times. Varieties included Pioneer 0157, Pioneer 0157 Am, Pioneer 0157 Amxt, Golden Harvest G00H12-GT/LL, Golden Harvest G00H12-5122, Hefty H5030, Hefty H5003, Hefty H4522, and Hefty H4521. Students took early season stand counts on 5/23/21 but data hasn't been analyzed statistically yet. Much of the plot maintenance is conducted by **student workers funded by this grant**. So far summer student workers have learned of common weeds, what particular insect pest damage looks like, how to conduct stand counts, common scouting procedures, how to take soil samples, and how to fertilize/incorporate. They will also lead the harvest, yield analysis, and economic analysis when the time comes. These events thus far have largely fulfilled the grant's **Objective 1.**

At the time of this updates writing (Nov 1st) the plots have been harvested, but the data has not been analyzed. The student workers (Justin Otto and Nathan Seehafer) finished harvesting the plot on Oct 25th and Nathan will be meeting with me the first week of Nov to learn the basics of statistical analysis. Nathan also learned how to drive a combine and harvest corn. Both Nathan and Justin have been able to use the experiences gained from managing this plot to get credits for graduation under SMSU's **AGRO 494 Independent Study** course.

Likewise, SMSU's **AGRO 341 Principles of Pest Management**, taught by Kirsten Brichler M.S., has used the plot for education purposes. This is an agronomy course but includes 7 students across multiple agriculture majors who may not have the opportunity for field experiences. Students would visit the fields weekly in class and collect insects for a class collection and scout fields for weed, disease, and insect problems to complete a field scouting project. The prominence of the corn lodging in the conventional varieties provided a solid demonstration of what high corn rootworm pressure looks like. Similarly I have used these plots as a demonstration of how useful Bt traits are in controlling corn rootworm damage in my **AGRO 132 Crop Production and Management.** Like **AGRO 341**, this is a course which includes 28 students across multiple ag majors. I will eventually use this data for my **AGRO 454 Experimental Design**, where we will use it for statistical analysis.

So in summary, steps have been taken towards completing **Objectives 2-4,** primarily by getting harvest done. At the time of this updates writing though, not enough work has been accomplished to complete **Objectives 2-4**. I suspect we may be able to get a report together by next progress report time though.

2.) IDENTIFY ANY SIGNIFICANT FINDINGS AND RESULTS OF THE PROJECT TO DATE. (*There may be none to report at some stages of the project)*
This project detailed 4 goals at its inception:

1. Students will be using the plot as an educational tool to learn various aspects of corn growth and development
2. Students will be evaluating yield results to see how the trait differences is performed
3. Students will evaluate the economics to determine which trait or lack there of produce the greatest return on investment
4. Data from this project will be available to the agricultural community

At the moment, only **Objective 1** has been achieved with the student interns (3 total) working the plots. This is due to the fact that the SMSU school year has not started yet, nor are the corn plots mature enough to harvest. Once the school year starts, there will be ~40 students who will be able to utilize the plots for educational purposes including identification of lodging, corn rootworm damage, and value of Bt traits.

Our weed situation is explained in the "Challenges Encountered" area below, but we have noticed we have amazing rootworm pressure at field plots. Every variety without a Bt trait has significant amounts of lodging. Double and triple stack varieties are doing much better and will likely be our highest yielders. Due to this difference in performance it will be readily apparent how much a Bt trait could save a grower.

As mentioned in section 1 above, harvest is complete! Data has not yet been statistically analyzed, but I will be meeting with Nathan the first week of Nov to go over the fundamentals of statistical analysis. Nathan will also be the primary student who will conduct the economic analysis and determine which product provided the greatest return on investment (**Objectives 2 & 3**). Both students have been conducting this project thus far for school credit. For **Objective 4,** results will be posted online as a student poster and/or a document once complete.

3.) CHALLENGES ENCOUNTERED. (*Describe any challenges that you encountered related to project progress specific to goals, objectives, and deliverables identified in the project proposal.*)

This has been a bad year for rain. The SMSU field plots have only received 5.51 inches of rain this entire year at the time of this updates writing (August 9th). As a result, our preplant herbicides did not activate to their full efficacy and our number one problem has been weed control combined with moisture-limited early season growth. Our weeds were simply able to outcompete the corn. As this is a variety trial, with each variety exhibited different herbicide tolerances, we have been cautious of spraying specific herbicides (Roundup, Liberty, etc.) beyond atrazine due to the drift potential. This will obviously have an impact on our results as we have lost some yield to weed pressure but we determined it was more risky to spray herbicides in a mixed variety plot. While I initially thought some of our plots would need to be hand harvested in order to calculate yield, a number of late season rains and weed die off reduced the weed pressure, and we were able to harvest most plots. The late season rains, reduced undergraduate student availability due to classes, and multiple combine issues did however delay our harvest by a week or two which was unfortunate.

4.) EDUCATION AND OUTREACH ACTIVITES. *(Describe any opportunities to engage with farmers, influencers or the media about your project.)*

Every summer for the past 3 years, SMSU hosts a field day in which the plot coordinator (myself) goes over the projects and their results at that point in the growing season. This past field day was held on July

21st and had ~100 people in attendance. Participants included local farmers, businesses, students, and two media outlets (https://www.marshallindependent.com/news/local-news/2021/07/from-the-fields-to-the-community/). Given the date of the outreach event, there wasn't many results to communicate, but SMSU is developing a program to bring high school ag classes out to the plots for educational outreach and recruiting. This will be the first year such a program is conducted, but will include this MNCRPC funded project.

5.) HOW CAN WE HELP? *(Please let us know how we can improve the experience or assist in your project if possible.)*