



Research & Demonstration Grant Funding Program Annual Report

Please return the completed form along with the below referenced supplemental information to Jason Coleman at jason.coleman@hpwd.org.

NAME: Wenwei Xu	
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PROJECT TITLE: Drought and heat tolerant short-season corn hybrids for grain and silage production under limited irrigation in the Texas High Plains	
TOTAL FUNDING: \$20,000	
PROJECT COMPLETED: <input type="checkbox"/> Yes or <input checked="" type="checkbox"/> No	EXPECTED COMPLETION DATE: June 15, 2020
PREFERRED PRESENTATION MONTH:	

Attached to this document please provide the following supplemental information:

- Financial report showing expenses, remaining funds, and financial contributions from cooperators and other funding sources.
- Any supplemental materials you would like the HPWD Board of Directors to review.
- A copy of the presentation materials for the HPWD Board of Directors meeting presentation.

1. Describe your progress to date with the project (Word Limit 150):

Drought/heat-tolerant short-season corn hybrids is an important genetic tool to sustain corn production with limited irrigation. In 2019, we conducted small-plots research in Lubbock, Halfway, Bushland, and San Angelo; performed on-farm demonstration of our multiple stress tolerant short-season corn for sustained corn production and water conservation at Kress; and developed new lines and hybrids. In 2020, a US seed company started selling three new corn commercial hybrids that are made with our lines and are available to producers in Texas and southern states. Another seed company is in the process of signing a commercialization agreement for licensing our short-season lines and hybrids.

2. Describe successes or setbacks observed with implementing the project (Word Limit 150):

In addition to the progress described in Section 1, we have developed several high-value high-antioxidants Hi-A™ specialty corn lines that are well adapted to West Texas conditions, both for fresh

ear produce and corn nuts. These Hi-A™ lines will enable us into next phase of developing innovative genetic approach for water conservation –high-value corn hybrids for producing healthy human food such as black or red corn ears and large-kernel corn nuts.

Our research effort on developing innovative water conservation technologies for crop production in five areas: (a) producing more grains and/or silage with the same amount of water and stabilizing crop production under severe drought conditions by developing drought and heat tolerant hybrids; (b) reducing mycotoxin (aflatoxin and fumonisin) contamination to minimize both economic loss and inefficient water use by developing and deploying mycotoxin-resistant corn hybrids; (c) enabling feasible corn production with limited irrigation water by developing drought/heat-tolerant and mycotoxin-resistant short-season corn; (d) increasing crop value by developing high-value healthy human food and animal feed; and (e) optimizing water allocation, timing and application of irrigation water by developing advanced irrigation scheduling tools.

3. Describe the results of the proposed work objectives and expected impact of the research/demonstration being conducted (Word Limit 250):

Objective 1: Field demonstrations will be conducted at the Texas A&M AgriLife Research Farm at Lubbock, Halfway and Bushland. Figure 2 presents part of the results in 2019.

Objective 2 - to continue the development of new inbred lines and hybrids: We have developed several inbred lines with black or red kernels (Figure 1) and made a first set of specialty corn hybrids. These hybrids will be evaluated in replicated small plots in Lubbock, Halfway, and Bushland. These high value specialty corn will become a new source of food, a new tool to generate income by concentrating limited irrigation resources using high efficiency irrigation methods (i.e. subsurface drip irrigation and advanced low pressure center pivot systems) on relatively small areas producing a high value crop, and therefore a powerful approach to conserve previous underground Ogallala Aquifer water.

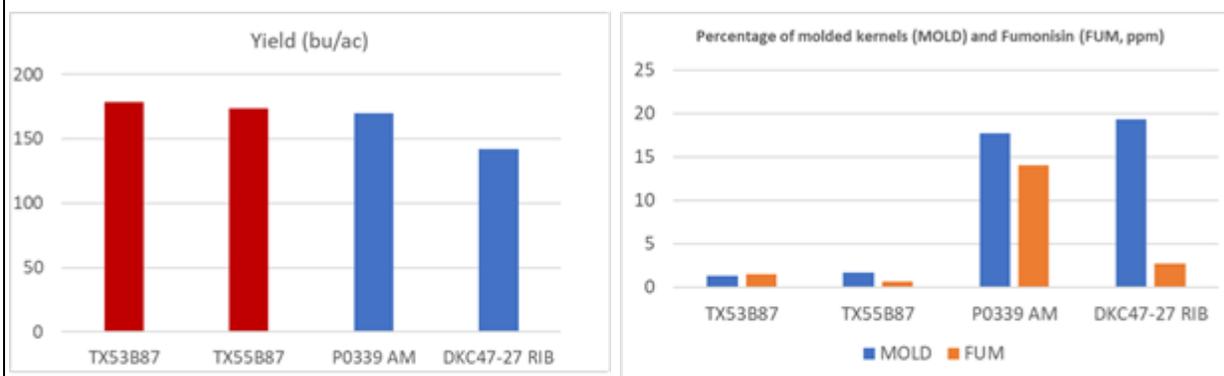


Figure 2. Grain yield, percentage of molded kernels, and fumonisin (ppm) in four short-season, Texas A&M AgriLife TX53PA1 and TX53B87 and two commercial hybrids in San Angelo, TX in 2019.



Figure 1. Ears of the high antioxidants Hi-A™ specialty corn developed by Dr. Xu at Texas A&M AgriLife Research in Lubbock, Texas

4. Describe the conservation impacts to the District (Word Limit 150):

Three new corn hybrids: A regional US seed company launched three corn hybrids made with our line. The company markets these hybrids in Texas and other southern state. Dr. Xu has arranged on farm-demonstration if these hybrids in Lubbock, Hale, Randall, and Porter counties.

Commercialization agreement: A Midwest seed company is currently working on an agreement with Texas A&M AgriLife Research to license and commercialize our short-season corn lines and hybrids.

5. Please describe any outreach and communication plans you have for this project, including any awards submissions or potential opportunities for publishing (Word Limit 150):

Active outreach to producers and seeds companies: To facilitate the transfer of the genetic technology developed from this project, we hosted tours to seed companies and producers during the 2019 crop season in 2019. For examples:

- Small group field tours with corn producers were conducted on June 30, August 8, and August 19 in Lubbock, Halfway, and Ganado, Texas.
- Plots tours with breeders from private seed companies on July 1, July 18, July 30, July 31, August 9, and September 4 in Texas Lubbock, Halfway, Bushland, and Ganado, Texas.
- Presentation at Swisher/Hale County Field Day, August 2, 2019.
- Presentation at Ag Agents Field Day, Halfway, TX on August 29, 2019.

Research and demonstration proposal to Texas Water Development Board Agriculture Water Conservation Program: submitted in February 2020.