Kansas Grain Sorghum Commission

Investment Profile Summary

2017

The Kansas Grain Sorghum Commission investments reflect a strategic approach to advancing sorghum through farmer driven priorities and (largely) public research. The portfolio entails a concerted, long-term crop improvement platform that is complemented and leveraged with more current issue priorities and marketing focused investments. While the investment is focused on long-term advancement for sorghum, the portfolio delivered several “wins” in the recent period.

K-State

* Education to enhance sorghum productivity and profitability management reached 150 growers at the 2017 KSU Sorghum Schools.
  + Sorghum schools presented an estimated economic impact as related to changes in management and potential yield benefits/cost savings close to $2.5 million dollars.
  + Data collected on the Sorghum Schools via survey mechanism demonstrated that 98% found the information presented at the Schools to be ‘valuable or very valuable’ and with 87% of all responses reflecting that the information might help in change sorghum management for increasing productivity and profitability.
* Released nine seed parent lines (KS133A/B to KS141A/B) in 2014. These lines are short in height, panicle with complete excertion, good combining ability and standability with excellent potential to develop high-yielding hybrids under drought stress conditions. Released lines seeds were provided to seed companies (DuPont Pioneer, Chromatin, Richardson Seeds and Scott Seeds) through formal Material Transfer Agreements).
* Released six new pollinator (R) lines (KS142R to KS147R) in 2017. These potential lines are good combiners with high yielding hybrids potential under drought stress condition.
* Developed five advanced cold tolerant breeding lines (ARCH12002, ARCH12012, ARCH12045 and ARCH10747-1 and ARCH10747-2). These lines are derived from exotic sources, tannin free and have desirable agronomic traits.
* The IGP Institute reached 57 individuals from four different countries through technical training and education specific to sorghum market development. KGSC has followed USCP’s lead similar to its efforts with U.S. Grains Council to more target IGP efforts. Thus, two container seminars were conducted. Container action through Edgerton, KS is increasing.
* KGSC supported sorghum breeding program at Kansas State University releases outstanding seed and pollinator parents. Yield tests of hybrids from the new releases show great promise for transforming sorghum production in Kansas.
* Enormous potential to develop a new herbicide-tolerant sorghum technology for post-emergent broad-spectrum weed control
* Marker-assisted selection is an essential tool to deliver traits to growers. For the first time, we have a fully-operational marker-assisted selection program for KSU sorghum
* Launched the first year of the Collaborative Sorghum Investment Program with farmer deliverable priorities orienting high capacity research teams to create farmer field results.

HPI

* 1. Search for naturally occurring haploid inducing pollinators for sorghum. Several candidates from this year’s field trial look really promising. HPI has propagated these in the greenhouse and are currently processing for root tip squashes for chromosome counts.2. Genetics & Genomics Approach - CENH3 target
* HPI has identified a single-copy gene that appears to be the homolog of CENH3, based on protein sequence homology and expression profiles
* HPI has identified two CENH3 point mutants in sorghum
* Two “CenH3 Tail Swap” sorghum transformation vectors were built

3. Genetics & Genomics Approach - MTL target

* Identified DNA sequence of the sorghum MTL homolog and is developing a system for knocking out MTL via gene editing
* Design of MTL “guide RNAs” which are essential for use of the popular CRISPR/Cas gene editing system
* Identified several existing sorghum lines with naturally-occurring MTL mutations, and screening for haploid inducing potential

USDA-ARS

1. Release of R.LBK1 and R.LBK2 sorghum germplasm lines with SCA tolerance and discovery of new SCA tolerant sources
2. Identification of cold tolerance genetic markers and development of marker-trait introgression lab (in collaboration with Geoff Morris, KSU)
3. Material transfer agreements with five U.S. companies testing hundreds of new USDA breeding lines