GRAIN SORGHUM RESEARCH AND EXTENSION NEEDS

Jesse McCurry, Regional Director
Our guiding model.

Need more acres.
Our farmer leadership.

- 13 member board
- 5 seats for (KS)
- 3 seats for (TX)
- 1 seat for (SD)
- 4 at-large
Farmer Priorities – pre 2/24/15

1. Grass and Weed control
   - Always the most consistent #1
2. Yield development
3. Cold tolerance
4. Drought tolerance
5. Disease resistance development
6. Management
7. New gene introduction
8. New genetic introduction
9. Information management
10. facilitation

What farmers want.
Crop Improvement Priorities NOW

• Over-the-Top Grass Control
• Yield Development and Enhancement
  1. Breeding
  2. Field-level management
• Seed Innovation
  1. Conversion Program
  2. Advanced breeding techniques and tools
  3. Development of new and novel genetic traits
• Information Management
  1. Sorghum Research Database
  2. Genomics Database

*The Committee will strategically facilitate all priorities towards commercialization through collaboration between public and private researchers and industry stakeholders. All research outcomes will be targeted towards producer profitability.*
Revised HVM Objectives

International Markets
- Education
- Training
- Building Relationships

Consumer Markets
- Awareness
- Promotion
- Image Development
- Branding

Livestock Nutrition
- Education
- Training
- Non-Traditional Markets

Specific Attribute
ID/New Use Development
- Research
- Niche Markets
- Chemical Derivatives

Sorghum: The Smart Choice
Renewables Priorities

1. Alternative markets for coproducts
   1. Adhesives, waxes, aquaculture
   2. What is in the DDGS?
   3. Carnuba wax replacement (turtle wax)

2. California LCFS and sustainability issues
   1. Data collection
   2. Model design

Even more focused.
Bridging the Gap...Moving the needle

Private industry is required.
RFPs

USCP

Kansas Commission

Investments and Cycles
USCP RFP Proposals:
- Total 119 pre-proposals at $20 million
- 51 for crop improvement at $11.3 million

KGSC RFP Proposals:
- Total 26 pre-proposals at $996,051
What USCP Funded – 3.65m

- David Stelly of Texas A&M University was funded $240,488 to identify methods of eliminating gene flow from sorghum to johnson grass.
- Muthukumar Bagavathiannan of Texas A&M University was funded $213,419 for the development of new sources of herbicide resistance in grain sorghum.
- Bryan Ayre of University of North Texas was funded $225,000 for the development of methods to enhance breeding opportunities.
- Bob Fanning of South Dakota State University was funded $10,000 for establishing a Nebraska and South Dakota production guide.
- Mithila Jugulam of Kansas State University was funded $30,000 for herbicide development.
- Paul Ulanch of North Carolina Biotech was funded $98,314 for grain sorghum variety evaluation.
- Nancy Turner of Texas A&M University was funded $130,000 for pet food development.
- Lonny Sweet of The Connect Group was funded $200,000 for branding and public awareness within the food industry.
- Jim Zenner of JPZ Consulting was funded $41,500 for institutional food promotion.
- Earl Roemer of NuLife Market was funded $120,000 for food development.
- Jason Bootsma of Prairie Aqua Tech was funded $120,000 for livestock nutrition.
- Jim Zenner of JPZ Consulting was funded $80,200 for food industry promotion.
- Rhonda Miller of Texas A&M University was funded $69,000 for food development.
- Sajid Alavi of Kansas State University was funded $130,000 for pet food development.
- Morawicki of University of Arkansas was funded $90,000 for animal nutrition.
- Nancy Turner of Texas A&M University was funded $185,000 for coproduct enhancement.
- Mark Riley of University of Arkansas was funded $74,953 for coproduct enhancement.
- Battelle was funded $80,000 for coproduct enhancement.
- Daria Aragon of Louisiana State University was funded $30,000 for biofuels enhancement.
- Michael Aide of University of Missouri was funded $8,000 for biofuels enhancement.
# External Advisors

## United Sorghum Checkoff Program

### Crop Improvement

- **Bob Klein**
  - USDA-ARS
  - 2881 F & B Road, Room 108
  - College Station, TX 77845
  - (T) (979) 777-4470
  - (C) (979) 882-4802
  - bob.klein@ars.usda.gov
  - Bobklein04@gmail.com

- **Cleve Franks**
  - DuPont Pioneer
  - 2260 CR 80
  - Plainview, TX 79072
  - (T) (806) 268-4862
  - (C) (806) 262-2327
  - cleve.franks@pioneer.com

- **Gary Pierzynski**
  - Kansas State University
  - 114 Waters Hall
  - Manhattan, KS 66506
  - (T) (785) 532-6101
  - (C) (785) 537-3204
  - gmip@ksu.edu

- **Bill Rooney**
  - Texas A&M University
  - 2474 TAMU
  - College Station, TX 77843-2474
  - (T) (979) 845-2151
  - (C) (979) 220-1951
  - wh@tamu.edu

### High Value Markets

- **Kim McCuiston**
  - Texas A&M University-Kingsville
  - 700 University Blvd.
  - Kingsville, TX 78363
  - (T) (361) 593-4863
  - (C) (361) 876-5409
  - kim.mccuiston@tamuk.edu

- **Kerry Wefald**
  - Kansas Department of Agriculture
  - 1320 Research Park Drive
  - Manhattan, KS 66502
  - (T) (785) 564-6758
  - (C) (785) 250-5641
  - kerry.wefald@kda.ks.gov

- **Joe Kelley**
  - Agricultural Export Center
  - 911 South Wharton Street
  - El Campo, TX 77437
  - (T) (979) 543-8284
  - (C) (361) 235-1775
  - jke@unitedaq.net

- **Timothy J. Dalton**
  - Sorghum and Millet Innovation Lab
  - Kansas State University
  - 148 Waters Hall
  - Manhattan, KS 66506
  - (T) (785) 532-7178
  - (C) (785) 477-8239
  - tdalton@k-state.edu

### Renewables

- **Matt Durler**
  - Conestoga Energy Partners, LLC
  - 300 N Lincoln
  - Liberal, KS 67901
  - (T) (620) 628-2053
  - (C) (620) 408-5289
  - matt.durler@conestogaenergy.com

- **Scott Staggenborg**
  - Chromatin, Inc.
  - 8509 Venita
  - Lubbock, TX 79424
  - (T) (806) 300-0593
  - (C) (785) 313-3115
  - ssstaggenborg@chromatininc.com

- **Derek Peine**
  - Western Plains Energy, LLC
  - 3022 County Rd. 18
  - Oakley, KS 67748
  - (T) (785) 672-8810
  - (C) (785) 672-7655
  - dpeine@wpello.com

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*Updated 1/21/2015*
Research must connect to private industry to connect to farmers’ fields

Connecting the Research Farmer Seed Bag

Public Research Industry Development Investment Priorities Farmer Input

Private Industry Farmer Seed Bag
Industry Needs

- $280M, 10 years New Active Ingredient
- $500K to Extend a Current Label to Sorghum
- $150M, 10 years to develop a GMO Trait
Kansas Commission - Proposals are due by April 30, 2015.

- **Weed Control**
  - Research focusing on the identification of new genetic sources for resistance to available grass control herbicides.
  - Management research addressing herbicide treatment and farm based weed control.

- **Yield**
  - Genetic and breeding research targeted towards increased yields in both high yielding and limited resource environments.
  - Research focusing on best farm management practices for top yields. This priority can include but is not limited to: farm trials, extension meetings and on-farm management case studies.
  - Identify best management practices for both full and limited irrigation practices.

- **Standability**
  - Researching the key components attributed to standability.
  - Proposal directed toward ensuring genetics in producers’ fields have strong standability.

- **Sorghum Economics and Profitability**
  - Production economics focusing on farm profitability and sorghum return relative to other crops.
  - Water economics to include but not limited: water response curves and limited irrigation returns.
  - Basis drivers evaluating the impact of ethanol, feed markets, exports and other market drivers on interior Kansas basis markets.

- **Disease Control**
  - Evaluate how plant health and disease resistance are influenced by management including but not limited to fertilizer, seed treatment, and seeding rates.
  - Genetic research targeted toward plant health and disease resistance.

- **Insect Control**
  - Evaluation of economic threshold for treatment and insect control related to profitability.
  - Chinch bug management and control.

Research proposals outside of these priorities will be considered. Strong proposals will provide a linkage and vision for commercialization of project outcomes. For further clarification or questions regarding your proposal please contact the commission at (785) 477-9474 or jill@ksgrainsorghum.org.
Objective I: Water Use Efficiency Curve Update

Objective II: Best Management Practices for Limited Irrigation

Objective III: Sorghum Water Economics

Investment: $149,982

Objectives:

1. Compare the yield response and water use of grain sorghum and drought-tolerant corn in dryland, limited, and full irrigation scenarios.
   a. Lead: Gary L. Cramer
   b. Co-investigators: Eric Adee, Ignacio Ciampitti, Johnathan Holman, Kraig Roozeboom, Alan Schlegel

2. Determine the top end grain sorghum yield potential under very well-watered conditions (100% ET) at three locations in western Kansas (Colby, Garden City and Tribune) and the effect of irrigation timing on grain sorghum yields under very limited irrigation (6 or 10 inches total) at Colby, Tribune and Garden City.
   a. Lead: Isaya Kisekka
   b. Co-investigators: Lucas Haag, Johnathon Holman, Freddie Lamm, Alan Schlegel

3. Determine the economic cost/benefit of irrigated grain sorghum production under diverse water regimes.
   a. Lead: Bill Golden
   b. Co-investigator: Dan O’Brien
2015-2016 Kansas Priorities

- **Weed Control**
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  - Management research addressing herbicide treatment and farm based weed control.

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Kansas Commission RFP

Timeline

- Proposal Deadline April 30, 2015
- Selected Presentations Mid Summer
- KGSC Funding Decisions prior to Oct 1
RCPP possibilities??

How can we leverage partnerships and the right idea?
The horizon for sorghum genetics is bright

- **Double haploid**- allows plant breeders to shave years off of their breeding programs
- Approximately 7000 genetic lines to be processed or distributed to sorghum genetics community through the USDA Germplasm Unit
- Sorghum Conversion Program delivered 142 new genetics to 15 public and private entities

The game is changing at EPA.
Crop Improvement

- Leveraging valuable research through collaborative and strategic investments with private entities
  - *Built relationships with “Big 6” chemical and genetic providers*
High Value Markets

- Increased number of product lines
- Increased product formulation percentage
- Increased number of Suppliers
- Co-Branding

Sorghum: The Smart Choice

One “customer” at a time...
WINS

Moving “The Needle”

Panera BREAD

Pearlized & Whole Grain - 2014
California Cereal Products - 1st Qtr 2015

Sorghum Flour – Dec 2014
Sorghum Protein Powder – Nov 2014

5 FCL – Birdseed (New) – Nov 2014

November 2014

2014?

October 2014

Krusteaz Gluten Free

GREAT FLAVOR

Guaranteed

Pearlized & Whole Grain - 2014

MY VILLAGE

2014 – Dofu/Pancakes

Moving “The Needle”

SORGHUM: THE SMART CHOICE
High Value Markets

- **Food sector focus**
  - Culinary, Consumer, Institutional, Food Processor and Formulators.
  - Execute a strategic PR campaign to and leverage media to manipulate consumer behavior to promote sorghum consumption.
  - Collection of sorghum based recipes.
  - Promoting experts to speak on our behalf.

- **Sell your product**
  - Great Grains: 218 placements, 5.5 million in print impression, $413,000 in advertising equivalency.
  - 202 placements, 692 million in print impressions
Authors & Social Media Experts

Ronni Lundy – Sorghum Savor – Due Out Spring 2015

Lauren Pincus – Nutrition Starring You – “Population” Group Focus (Diabetic/Obese)

Triad To Wellness, LLC – “Professional Sector” Group Focus - Social Media Program
• Promo Events
• Twitter Parties
• Facebook
• Instagrams
• Pinterest

Promoting “Experts” To Speak On Our Behalf!!!
Associated Press Media Pickup

The Final Proof: October 2014
Sorghum: The "New" Ancient Grain

202 Outlets = > 692 “Million” Impressions
(May 30, 2014)
# High Value Markets

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Formulas</th>
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<tbody>
<tr>
<td>IAMS</td>
<td>Iams® Veterinary Formula™ Weight Loss/Mobility Plus Restricted-Calorie™ dry dog food formula, Iams® Veterinary Formula™ Glucose and Weight Control Plus Optimum Weight Control dry dog and cat food formulas, Iams® ProActive Health™ Adult Indoor™ Weight &amp; Hairball Care dry cat food formula</td>
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<tr>
<td>Mr. Bucks Pet Food</td>
<td>Rescue Blend Special Recipe, Rescue Blend Everyday Recipe, Chicken &amp; Brown Rice</td>
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<tr>
<td>Eukanuba</td>
<td>Most dog and cat dry foods</td>
</tr>
<tr>
<td>Pet Wants</td>
<td>Chicken Meal &amp; Brown Rice dry dog food, Salmon Meal &amp; Brown Rice dry dog food, Lamb Meal &amp; Brown Rice dry dog food, Buffalo Meal &amp; Duck Meal dry dog food, Lean Dog Formula, Maintenance Formula, Puppy Formula, Lean Cat Formula, Adult Cat Formula, Kitten Formula</td>
</tr>
<tr>
<td>Hills Pet Nutrition</td>
<td>Hill’s® Healthy Advantage® &amp; Hill’s® Science Diet® dry dog formula</td>
</tr>
<tr>
<td>Newman's Own Organics</td>
<td>Adult and Advanced dry dog and cat formulas</td>
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**What’s In A Name?**

1. Collaborate with current users (Iams, Science Diet)
2. Increase ingredient usage in new formulations
3. Product Development (Treats) - KSU?
4. Non-Food Applications (i.e. Dermal)
5. Educate/Counter “Grain-Free” Movement

**Internal Review Only – Not For Distribution**
Strengthen China’s Market

The collaborative efforts of the Sorghum Checkoff and the U.S. Grains Council have helped strengthen this market by developing relationships with Chinese grain buyers.

- Total commitments were 15.5 million bushels.
- This brings the total year’s commitments to 181.8 million bushels.
- 91% of the total commitments from last year!
Power of Demand

Sorghum Basis Differentials for the Current Year

In a Year of 400 Mbu = to $172 million
California brings a little glamour to the Sorghum Belt

- Four plants wanting four shuttle trains per week, with a potential demand of 80 million bushels per year
- Significant incentives related to the California Low Carbon Fuel Standard

The age-old Sorghum Belt problem of weak new crop basis is a thing of the past

- Producer contracting at ethanol plants
Renewables

- Policy is key and we are talking to the policy makers
  - USDA and Department of Energy data is used by policy-makers, so ensuring their data is good can make or break the industry
  - Both are also funding significant research in sorghum, as is the California Energy Commission

- Supporting Projects Yielding Good Information
  - Delta BioRenewables is supplying both information and products to significant players, including seed companies
Taskforce process and outcomes

- **Extension Program in Limited Water**: Develop an extension model specifically to support LEMAs and limited water areas. The model will generate expertise and demonstration trials centered on sorghum production with cooperative efforts of local crop consultants and the agriculture extension network. Innovative approaches should be engaged including:
  - Cropping system evaluation and demonstration
  - Weather prediction models and forecasting
  - End-user market development and utilization evaluation including ethanol and unique high value sorghum chemistry

- **Crop Breeding and Genetics**: Focus current breeding programs to deliver material that links to private breeding programs. Outcomes of the breeding program should be high performing parent lines and trait specific attributes that support private industry commercialization of new traits and hybrids. Coordinate Kansas State genetic research with private industry to develop new crop breeding tools and markers that will accelerate crop advancements.
<table>
<thead>
<tr>
<th>Category</th>
<th>Action Item</th>
<th>Load Person</th>
<th>Next Steps</th>
<th>Deadline</th>
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</thead>
<tbody>
<tr>
<td>Technology and Crop Varieties</td>
<td>Establish a Technology Outreach Taskforce to assist in the working model development and implementation of the field scale demonstrations</td>
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<tr>
<td>Technology and Crop Varieties</td>
<td>Showcase, on a field scale, the latest technologies in irrigation infrastructure, irrigation water management, soil moisture measurement, conservation tillage, automation, telemetry and other agronomic practices aimed at reducing irrigation water use</td>
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<tr>
<td>Technology and Crop Varieties</td>
<td>Form a collaborative stakeholder team to set sorghum research priorities and develop research and funding strategy and present strategy to potential funding partners, including the Kansas Legislature</td>
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<tr>
<td>Technology and Crop Varieties</td>
<td>Ensure crop insurance policies do not discourage use of alternative, specialty and cover crops</td>
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<tr>
<td>Technology and Crop Varieties</td>
<td>Collaborate with crop consultants and other agricultural advisors to support farmers interested in less water intensive alternative crop production</td>
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<tr>
<td>Technology and Crop Varieties</td>
<td>Encourage state universities to expand engagement in development of teaching, research and extension programs related to less water intensive crop varieties</td>
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Help us keep sorghum a priority.
FY 16 RFP Process

• estimates: May 1 for pre-proposals. Full proposals due Aug 1
  • Funding decisions announced Dec.

• RFP items
  • Renewables
  • Crop Improvement
  • High Value Markets

• RFA items
  • More directive to specific providers

What this cycle will look like.
Key Thoughts

- Convert to grower value
- Upper echelons of irrigated sorghum yields
- Field level guidance for sorghum under irrigation
- Look exclusively at sorghum. It is a growing need.
- Demonstration type project
- What are the best management irrigated practices for sorghum?

Sorghum under 10-15 inches of water
Finally.

Questions?

How can you move the needle on the sorghum research agenda? How can I help?