

Sorghum and Millet Crop Germplasm Committee  
Frontenac Hilton Hotel, St. Louis, MO  
January 29, 2018

The meeting was called to order by Jeff Dahlberg, Chair at 4:30 PM. Introductions were made with several visitors to the meeting. We need to encourage greater participation of our members to these meetings, as only 8 of the 20 members were present. At one time, it had been discussed by the committee to count attendance to these meetings as a requirement of staying on the committee and perhaps this needs to be brought up again in our next meeting.

Dr. Dahlberg had sent out various reports that had been sent to him from Peter Bretting and others for review prior to the meeting. Also, corrections to the members listed were solicited. Dr. Gary Kinard talked about the efforts of the ARS to update these membership lists through the use of google docs and encouraged the committee to ensure that the list was accurate. I have updated the membership list and forwarded to the ARS (see attached updated list). Several past members were removed from the active list for various reason. Dr. Fred Miller was removed for health reasons and Merryln Spinks was removed as she has retired from ARS.

Drs. Jose Costa and Maureen Whalen provided an update to ARS as a supplement to Dr. Peter Bretting's report on the Germplasm system. Dr. Dahlberg provide an abbreviated report from Dr. Peter Bretting, who could not attend the meeting. The number of NPGS accessions in the system continues to grow and distributions continue to hover around 250,000 accessions per year. The budget for the NPGS peaked at roughly \$47 million in 2010-12 to its current level of \$44 million. Challenges to the system are many, including managing and expanding NPGS operational capacity and infrastructure and this is really evident with the upcoming retirements within the system. Characterization and evaluation of accessions continues to be a challenge and acquiring and conserving wild relatives continue to be a priority. Currently, there is a shortfall of approximately 10% in staff and with continuing resolution budgets and hiring freezes, hiring replacements or new people will be a challenge.

Dr. Melanie Harrison, new RL and Sorghum Curator at Griffin introduced herself to the group and provided her report on the unit. Overall, the collection is in good health (see attached file). Dr. Gary Kinard provided the 2018 report on the NGRL. There are opportunities with the Plant Exploration and Exchange program to strengthen our wild collection if there is interest. There is a project underway to information on historical plant introductions. If anyone on the committee has information that they might be willing to share, please contact Dr. Kinard. Several other updates were provided in his document (see attachment).

Dr. Doreen Ware was invited by the Committee to talk about the work on sorghum genetic & genomic community resources. Her group is working on something similar to Maize GB and she has formed a small group of advisors, Drs. Steve Kresovich, Mitch Tuinstra, and Cleve Franks to help navigate this project. The first year will concentrate on genomic sources and Sugarcane aphid to build a platform that will then be used for other traits of interest. She stressed the need for agreement on standards and is looking for help to make this successful and will be reaching out for participation in working groups to support this effort. The committee will continue to follow up and provide support as Dr. Ware moves forward with this project.

Dr. Tim Dalton provide a quick update on the USAID Sorghum program. The 5-year sorghum and millet project will be coming to an end in July 2018 and right now he continues to work towards keep this project funded and moving forward. USAID is in the process of determining whether or not to keep the program or retool. They currently have a project in Ethiopia that is bringing phenotyping and genotyping data together on Ethiopian germplasm and this data will become available for general use. There is a similar project underway in West Africa. The 2018 Global Sorghum Meeting in Cape Town is coming together. Currently they have received 450 abstracts/papers and 350 have signed up to come.

The Sorghum Conversion Project has released several partially converted and converted lines. Bob Klein and Leo Hoffmann sent a distribution announcement as an update to the program.

Discussion followed on the status of the Crop Vulnerability Statement. The Sorghum statement has been updated and submitted to ARS and we are working to complete the Millet statement.

No new business and meeting was adjourned.

## *Distribution Announcement*

### Germplasm Utilization and Enhancement of Sorghum Program: Distribution of Forty-four Introgression Populations

Leo Hoffmann, Jr.<sup>1</sup>, Nikhil Patel<sup>1</sup>, William L. Rooney<sup>1</sup>, Robert R. Klein<sup>2</sup> and Patricia A. Klein<sup>1</sup>

<sup>1</sup>Texas A&M AgriLife Research and <sup>2</sup>United States Department of Agriculture

January 2018

Forty-four populations of sorghum [*Sorghum bicolor* (L.) Moench] originating from backcrossing genetically diverse unadapted germplasm into elite public inbreds (BC1F1-derived F2 families) are available to sorghum research programs for further development. This germplasm is provided by the *Germplasm Utilization & Enhancement of Sorghum Strategy (GUESS)* Program which is sponsored by the United Sorghum Checkoff Program.

With help from the sorghum breeding community, the Texas A&M AgriLife Sorghum Research program identified a diverse panel of unadapted germplasm for introgression breeding. Selection of material was based on relative value for specific traits and general agronomic productivity in the native environment or specifically for genetic diversity. Original sources were characterized by genotyping-by-sequencing (GBS) and for fertility reaction in A1 cytoplasm. Lines that maintained sterility used BTx623 *ms3/ms3* as the recurrent parent and lines that restored fertility used RTx436*ms3/ms3* as the recurrent parent. Through this breeding scheme, new genetic diversity has been introduced into both heterotic pools (A/B, R) without compromising the fertility reaction of the derived germplasm pools.

Early flowering, short stature BC1F1 were selected in College Station, TX, from each of the 44 introgression populations, and one seed bulk per each population was created for distribution. Each population results from bulking pooled seed from ~50-300 BC1F1-derived F2 selections. Each bulk represents a pre-breeding resource that will require further selection and evaluation to determine the agronomic value of this introgression material. The two elite public inbreds both used genetic male sterility (*ms3*) to facilitate F1 and BC1F1 crosses so each population will segregate for recessively-inherited genetic male sterility for several generations. Beyond selecting for early flowering, short stature, fertile BC1F1 progeny, no further selection for improved phenotypes was conducted by the *GUESS* program participants prior to distribution of this material.

Passport data and agronomic information of the original NPGS accessions are contained in Table 1. Additional data on each of the original accessions may be obtained from the USDA-NPGS GRIN-Global database <https://npgsweb.ars-grin.gov/gringlobal/search.aspx>. If seed is acquired, requests for data from GBS of the original unadapted parent should be directed to Patricia Klein ([pklein@tamu.edu](mailto:pklein@tamu.edu)).

This distribution is a one-time offering from the previously listed agencies. Amount of seed for each of the 44 introgression populations varies based on the quantity of seed available within the BC1F1-derived F2 bulk. There is a \$1,000 one-time fee required to obtain these 44 populations. Upon payment, seed is distributed without any other constraints on the materials from this distribution, but redistribution of the original materials by the requesting agency to third parties is prohibited. Acknowledgement of the source of the material in publications is requested. **Requests for seed should be directed to the Texas A&M Sorghum Breeding Program, by e-mail to [leohjr@tamu.edu](mailto:leohjr@tamu.edu).**

**Table 1. Designation of Forty-four backcross introgression populations, with information and phenotypic observations of the original unadapted parent.**

Introgression population designation (BC1F1 deriv. F2)	Classification				Parental Phenotype							
	Unadapted parent	Recurrent parent	Country of origin	Race	Working group	Reasoning	Fert. rx.	Plant height (cm)*	Plant color	Pericarp color	Anthesis	
											LD	SD*
GUESS 2	SC1428	RTx436 ms3/ms3	Sudan	-	-	Imp. var.	R	173	Tan	White	PS	48
GUESS 4	PI 521999	RTx436 ms3/ms3	Malawi	Guinea	-	Grain M. res., biomass	R	236	Purple	White	PS	57
GUESS 5	PI 522039	BTx623 ms3/ms3	Malawi	Guinea	-	Food qual., Dis. res.	B	262	Purple	White	PS	61
GUESS 8	PI 536008	RTx436 ms3/ms3	Cameroon	-	-	Div. agro.	R	-	Purple	-	N/A	57
GUESS 9	PI 330272	BTx623 ms3/ms3	Ethiopia	-	-	Div. agro.	N/A	221	Purple	Red	PS	59
GUESS 10	PI 330272	RTx436 ms3/ms3	Ethiopia	-	-	Div. agro.	N/A	221	Purple	White	PS	59
GUESS 11	PI 510763	BTx623 ms3/ms3	Cameroon	Guinea	-	Dis. res.	N/A	216	Purple	White	PS	58
GUESS 12	PI 510763	RTx436 ms3/ms3	Cameroon	Guinea	-	Dis. res.	N/A	216	Purple	White	PS	58
GUESS 13	SC1400	BTx623 ms3/ms3	Honduras	-	-	Div. agro.	N/A	183	Purple	White	PS	64
GUESS 14	SC1400	RTx436 ms3/ms3	Honduras	-	-	Div. agro.	N/A	183	Purple	White	PS	64
GUESS 15	PI 291213	BTx623 ms3/ms3	Jamaica	Durra-caudatum	48 Durra-feterital/Kaura	Dis. res.	PB	315	Tan	Yellow	PI	63
GUESS 16	PI 533999	BTx623 ms3/ms3	Ethiopia	-	Subglad	Dis. res., agro	PB	257	Purple	Red	PI	57
GUESS 17	PI 536571	BTx623 ms3/ms3	Honduras	-	-	Dis. res.	PB	231	Purple	-	PS	57
GUESS 18	PI 563179	BTx623 ms3/ms3	Kenya	Caudatum	39 Caudatum-nigricans	Forage qual., biomass	PB	241	Purple	Red	PS	65
GUESS 19	SC1174	BTx623 ms3/ms3	Ethiopia	-	-	Dis. res.	B	251	Purple	-	PS	82
GUESS 20	SC1385	BTx623 ms3/ms3	Honduras	-	-	Div. agro.	B	208	Purple	White	PS	57
GUESS 21	GRIF17	RTx436 ms3/ms3	-	-	-	Dis. res.	B	178	Purple	White	PS	66
GUESS 22	PI 152828	RTx436 ms3/ms3	Zaire	-	-	Dis. res.	R	226	Purple	White	PS	55
GUESS 23	PI 248334	RTx436 ms3/ms3	India	Durra-caudatum	34 Durra-kaura	Food qual., Dis. res.	PR	239	Purple	Red	PS	61
GUESS 24	PI 276839	RTx436 ms3/ms3	Ethiopia	Durra	33 Caudatum	Dis. res.	R	257	Purple	White	PS	64
GUESS 25	PI 454051	RTx436 ms3/ms3	Ethiopia	Kafir	46(1) Nandyal	Dis. res., agro.	R	259	Tan	White	PI	73
GUESS 26	PI 454390	RTx436 ms3/ms3	Ethiopia	Caudatum	33 Caudatum	Dis. res., agro.	R	287	Purple	White	PS	68
GUESS 27	PI 454426	RTx436 ms3/ms3	Ethiopia	Kafir-durra	46 Durra-kafir	Dis. res., agro.	R	234	Tan	White	PS	70
GUESS 28	PI 454584	RTx436 ms3/ms3	Ethiopia	Kafir-durra	46 Durra-kafir	Dis. res., agro.	R	267	Tan	White	PS	72
GUESS 29	PI 454780	RTx436 ms3/ms3	Ethiopia	Durra	46(1) Nandyal	Dis. res., agro.	R	229	Tan	White	PS	72
GUESS 30	PI 454791	RTx436 ms3/ms3	Ethiopia	Durra	46(1) Nandyal	Dis. res., agro.	R	251	Purple	Red	PS	61
GUESS 31	PI 482903	RTx436 ms3/ms3	Zimbabwe	-	-	Forage qual., biomass	R	262	Purple	White	PS	56
GUESS 32	PI 494884	RTx436 ms3/ms3	Zambia	-	-	Dis. res.	R	229	Purple	White	PS	59
GUESS 33	PI 494891	RTx436 ms3/ms3	Zambia	Guinea	-	Food qual., Dis. res.	R	277	Purple	White	PS	65
GUESS 34	PI 521191	RTx436 ms3/ms3	Kenya	Durra-caudatum	-	Forage qual., biomass	R	221	Purple	Red	PS	59
GUESS 35	PI 524466	BTx623 ms3/ms3	Sudan	Guinea-bicolor	-	Bio., Dis. res.	R	234	Purple	Red	PS	59
GUESS 36	PI 524485	RTx436 ms3/ms3	Sudan	Caudatum	-	Bio., Dis. res.	R	244	Purple	White	PS	49
GUESS 37	PI 524916	RTx436 ms3/ms3	Zambia	Caudatum-Bicolor	-	Dis. res., agro.	R	168	Purple	White	PS	61
GUESS 38	PI 536565	RTx436 ms3/ms3	Honduras	-	38 Caudatum-kafir	Anth. res.	R	226	Purple	-	PS	72
GUESS 39	PI 536602	RTx436 ms3/ms3	Honduras	-	38 Cudatum-kafir	Dis. res.	R	274	Purple	-	PS	74
GUESS 40	SC1173	RTx436 ms3/ms3	Ethiopia	-	-	Dis. res.	PR	251	Purple	-	PS	59
GUESS 41	SC1180-1	RTx436 ms3/ms3	Nigeria	-	41 Durra	Dis. res.	R	264	Purple	White	PS	61
GUESS 42	SC1279	RTx436 ms3/ms3	India	-	-	Sugary end.	R	173	Purple	White	PS	62
GUESS 43	SC1365	RTx436 ms3/ms3	Honduras	-	-	Div. agro.	R	277	Tan	White	PI	59
GUESS 44	SC1387	RTx436 ms3/ms3	India	-	-	Midge res.	R	175	Purple	White	PS	69
GUESS 45	SC1404	RTx436 ms3/ms3	Honduras	-	-	Div. agro	R	180	Purple	White	PS	66
GUESS 46	SC1405	RTx436 ms3/ms3	Honduras	-	-	Div. agro	R	173	Tan	White	PS	48
GUESS 47	SC1428	RTx436 ms3/ms3	Sudan	-	-	Imp. var.	R	152	Purple	Red	PI	71
GUESS 48	SC1531	RTx436 ms3/ms3	Sudan	-	39(1) Zerazera	DM res, agro, long pan.	R					

\*Data collected in Puerto Rico 2016.