

Vast Genetic Variability in Sorghum

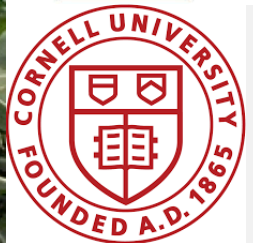
Public Sector Investment in Sorghum

Chad M. Hayes

Sorghum Geneticist



Institutions with Sorghum Programs



And others..

USDA Sorghum Programs

Lubbock, TX

- Drought Tolerance
- Cold Tolerance
- Exotic Sorghum

Lincoln, NE

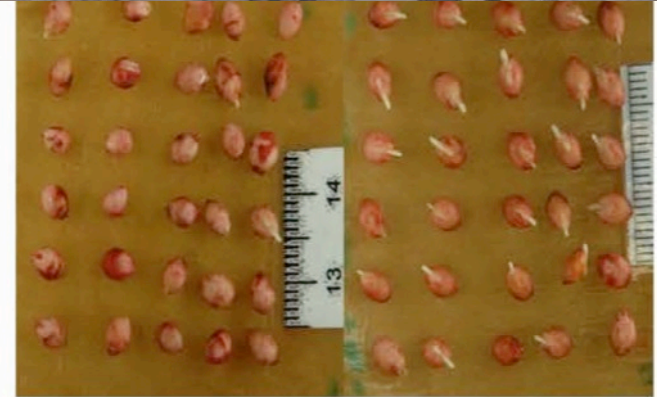
- Biomass Sorghum
- BMR Sorghum

Mayaguez, PR

- Sweet Sorghum
- PS Sorghum
- Disease
Resistance

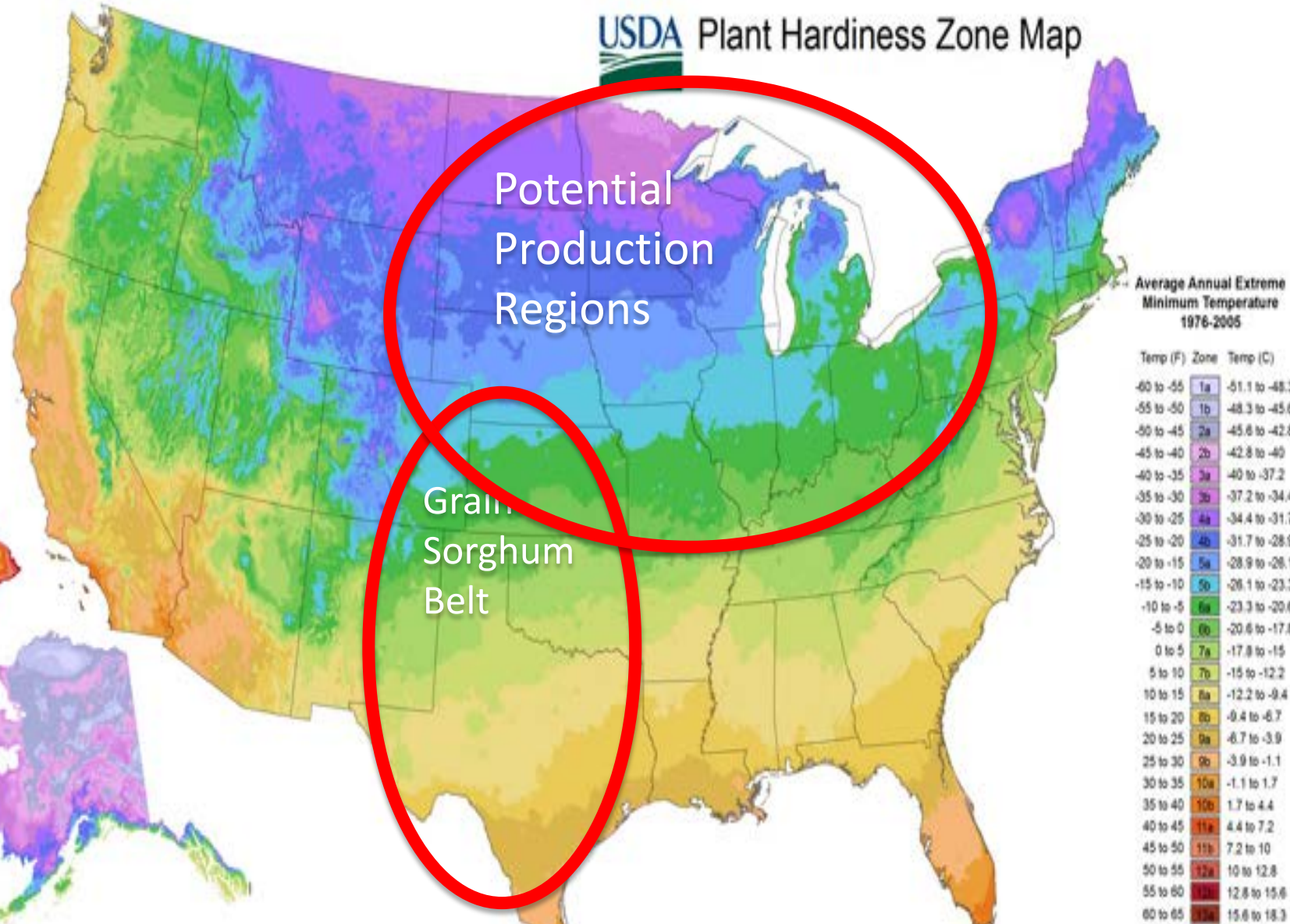


Cold Tolerance



Cold Germination at 12 C for 72 h

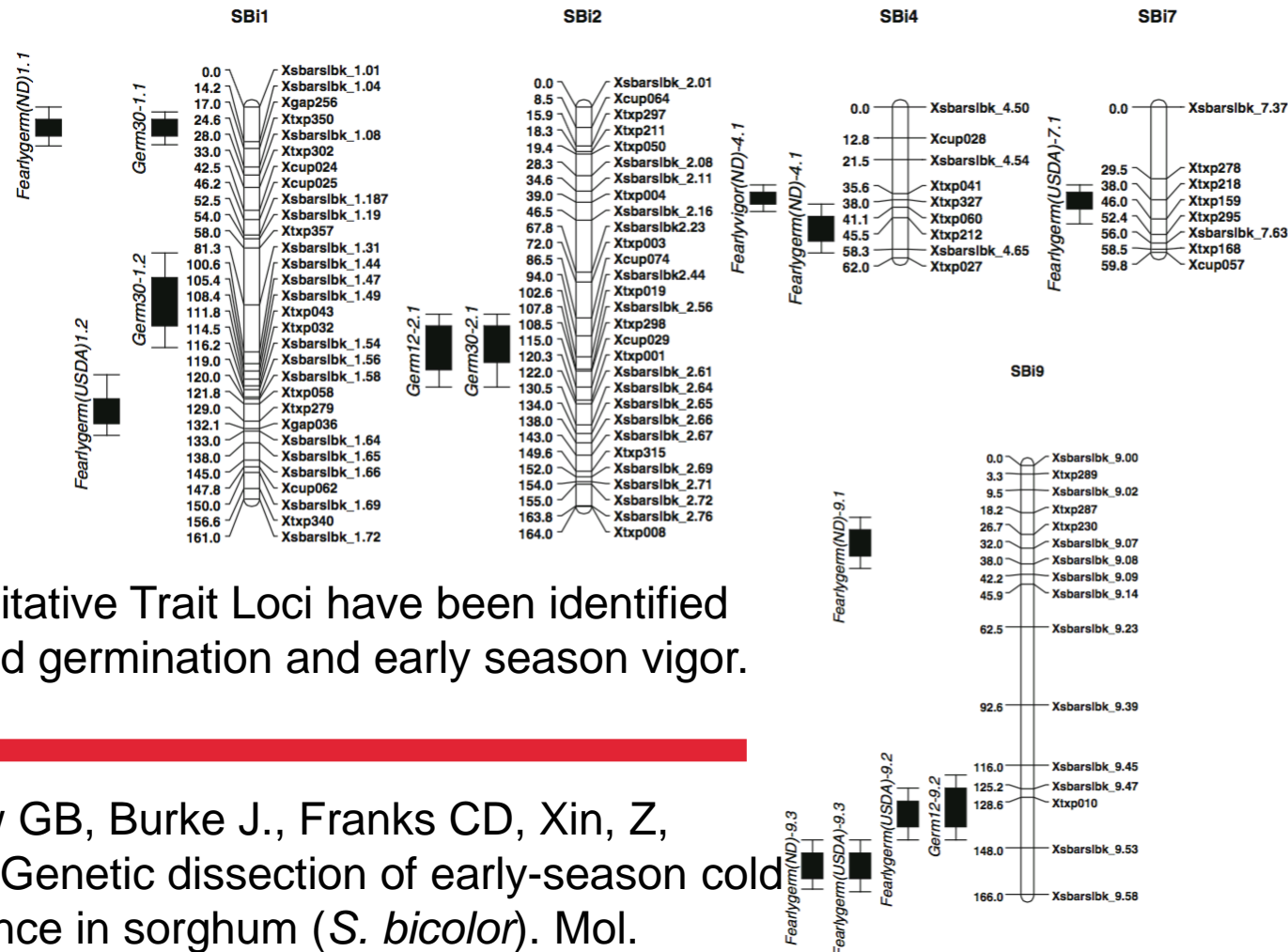
Cold Tolerance



Cold Tolerance



Cold Tolerance



Quantitative Trait Loci have been identified for cold germination and early season vigor.

Burow GB, Burke J., Franks CD, Xin, Z, 2011. Genetic dissection of early-season cold tolerance in sorghum (*S. bicolor*). Mol. Breeding, 28:391-402

“Exotic” Sorghum Introgression



“Exotic” Sorghum Introgression

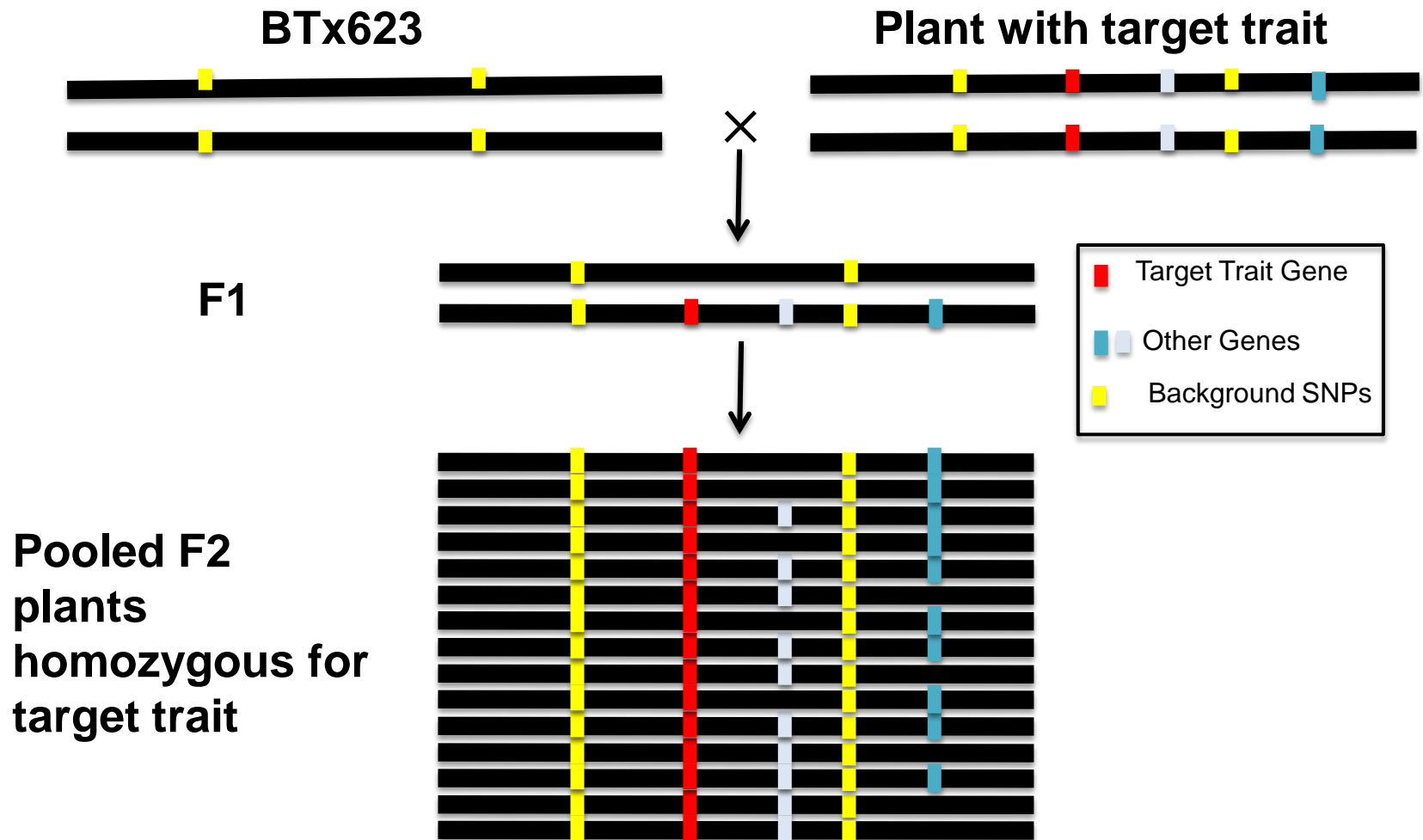
Germplasm Resources

Information Network- “GRIN”

- Over 40,000 sorghum accessions
- Most have never been evaluated
- Many traits of interest
 - High biomass
 - High Sugar
 - Drought tolerance
 - Many others



Induced Variation and Gene Discovery



Erect Leaf Sorghum



Short Leaf



Senescent Sorghum



High-throughput phenotyping for lignin content

Lignin content is inversely correlated with forage digestibility

Traditional biomass sampling is time-consuming

- Collaboration with Univ. of Nebraska-Lincoln
- “Hercules” platform
 - Described in Rundquist et al. (2014)
 - Used for over 10 years
 - Corn, soybeans; this is its first use in sorghum
- Equation validation Summer/Fall 2015



USDA-ARS Mayaguez, PR

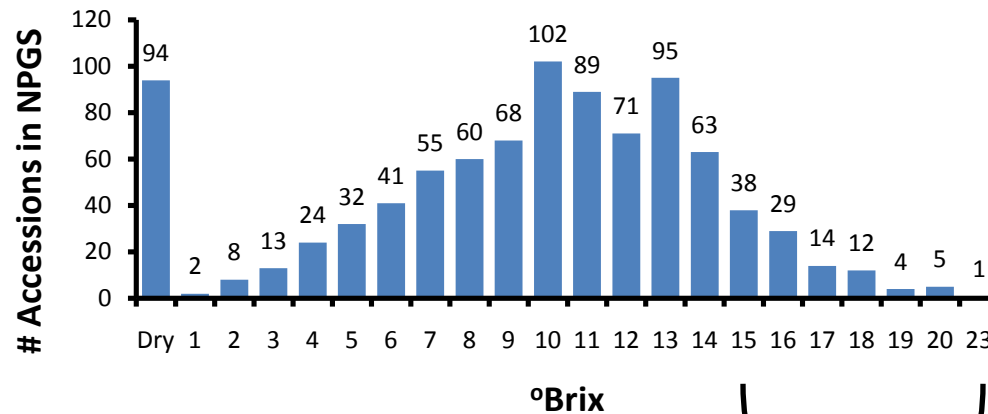
~2,180 Sweet Sorghum



Pressing the whole plant



Brix value (920 accessions)



Select the accession with Brix value > 15



Multi location field trial evaluation for biofuel
and agronomic traits



Take Home Message

- *Big Investments being made in Sorghum

- Sorghum Checkoff
- Private companies

- *USDA-ARS

- 3+ programs
- Tax-payer funded (partly)
- Materials freely available
- CRADA



Thanks

Contact:

Chad Hayes- Sorghum Geneticist
USDA-ARS Lubbock, TX
Cropping Systems Research Lab
806-749-5560
chad.hayes@ars.usda.gov

