DIVERSITY of SORGHUM

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SORGHUM ORIGIN

- Sorghum is from the family POACEAE
- Sorghum has its origin in Northeastern Africa as a wild plant
- Earliest known record of sorghum comes from Egyptian-Sudanese border and had been dated at 8,000 B.C.
- Sorghum belt is between 40 degrees North and 40 degrees South of the equator, in warm and hot countries characteristic for semi arid environment
- Sorghum is usually grown in areas that are too hot and dry for maize
- Over 50% of World sorghum varieties are hybrid, the lowest concentration of hybrid varieties is in Africa
- Hybrid production system is CMS
SORGHUM CLASSIFICATIONS

- Botanical classification
- Classification according usage

What do we see in the picture?

Source: KWS
SORGHUM TAXONOMY

Sorghum (Sorghum bicolor L. Moench)
- a tropical grass grown primarily in semiarid parts of the world, particularly in Africa, India and Asia, where it is an important staple food crop. It is a member of the family Poaceae and the tribe Andropogoneae, of which there are three main species:
  - **S. bicolor** - diploid (2n=20) all annual and domesticated types, including stabilized weedy derivatives such as Sudan grass. Widely distributed.
  - **S. halepense** - Johnsongrass. Tetraploid, native perennial of southern Eurasia, east to India.
  - **S. propinquum** - Diploid, native perennial of Sri Lanka and southern India.

Source: Cirad
I. Basic races:
- bicolor (B)
- guinea (G) - Sudanian area
- caudatum (C) – Eastern Africa
- kafir (K) – South Africa, mainly short plants
- durra (D) - East Africa, Middle East and India

II. Intermediate races: (all combinations of basic races)
- guinea-bicolor (GB)
- caudatum-bicolor (CB)
- kafir-bicolor (KB)
- durra-bicolor (DB)
- guinea-caudatum (GC)
- guinea-kafir (GK)
- guinea-durra (GD)
- kafir-caudatum (KC)
- durra-caudatum (DC)
- kafir-durra (KD)
III. Wild sorghum races: *S. bicolor ssp arundinaceum*. 

- arundinaceum
- aethiopicum
- virgatum
- verticilliflorum

(courtesy of J Hancock: Plant Evolution and the Origin of Crop Species; art work by Marlene Cameron)
RACES OF SORGHUM BICOLOR - PANICLE TYPES

Source: KWS
TAXONOMY OF SORGHUM TYPES USED IN AGRICULTURE

- Sorghum sudanense

- Sorghum bicolor x Sorghum sudanense

- Sorghum bicolor x Sorghum Bicolor slight tillering type with diverse directions of usage:
  - Sugar type
  - Forage type for silage
  - BMR
  - Grain type

Source: KWS
SORGHUM PANICLE TYPES - OPENESS

Closed (compact) Panicle

Semi Open Panicle

„Broom-Typ“ Open Panicle
MAIN TRAITS OF BICOLOR TYPE

- Almost no tillering
- Broad leaves
- Robust stem
- Lower sowing density

- Differences also according genetic origin or variety type
  - Closed panicles = Potentially of high sugar content
  - Broomcorn panicles = high yield potential and high lignin content
  - Kaoliang = good cold tolerance and earliness

Source: KWS
MAIN CHARACTER OF SUDANENSE TYPES

- Tillers – depending on type – sudanense pure has more tillers than crossing with Bicolor
- Thin leaves
- Thin stem
- Higher sowing density
- Weak to normal standability
- Weaker yield potential
- Earliness
- Good cold tolerance

Source: KWS
SEGMENTATION ACCORDING USAGE

- **BIOMASS SORGHUM**
  - Source: KWS, Buschmann

- **SWEET SORGHUM**
  - Source: http://grao.cnpm.embrapa.br

- **FORAGE SORGHUM**
  - Source: http://www.heritageseeds.com.au

- **GRAIN SORGHUM**
  - Source: KWS, Buschmann

- **MULTICUT SORGHUM**
  - Source: BGF Project

- **DUAL TYPES SORGHUM**
  - Source: http://oklahoma4h.okstate.edu
UTILISATION OF SORGHUM NON GRAIN TYPES

- Biomass sorghum (including dual types)
  - Biogas plants → Energy
  - Combustion plants → Energy
  - Feed
- Broom sorghum
- Forage sorghum (including BMR types)
  - Feed as fresh forage
  - Feed as hay
- Multicut Sorghum
- PPS Sorghum
- Sweet sorghum
  - Feed
  - Bioethanol productions
  - Sweeteners (Syrup, molasse, sugar)

Source: Cirad
Source: http://sirak.rs/hu/ciroksepru-forgalmazasa
BMR TYPE OF SORHUM

- High sugar content
- Lower Lignin content (about 40-60 % of normal biomass sorghum)
- Lower standability
- High digestibility
- High methane formation

Source: KWS
UTILISATION OF SORGHUM GRAIN TYPES

- Grain sorghum
  - Feed
  - Food
    - Tanin containing sorghum - alcohol production – e.g. Baijiu in China or beer
    - Tanin free sorghum - dry milling products and non gluten food products e.g. bread, flakes, pasta, puffs, crisps and chips
  - Bioethanol production

Source: https://nulifemarket.com
Thank you for your attention!