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# Germplasm/population development / trait analysis in CIRAD and partners

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# Association mapping for cell wall related traits (1)

A panel 413 accessions as a broad based
Association mapping population



Include Reference Set GCP and Cirad Core
Collection
7 genetic groups
Results are expected to be relevant for the whole sorghum community

#### Generation Challenge Program : 3367 accessions x 41 SSR



# Association mapping for cell wall related traits (2)

 $\odot$  Phenotyping mainly based on animal nutrition parameters

•NIRS calibration curve establishment for Biomass composition and CW related traits







=> Fibers (NDF), Lignin (ADL), Cellulose, hemicellulose, Nitrogen content (MAT), Non structural sugars, Van Soest Digestibility

 $\circ$  Low density genotyping

- •1000 Dart markers (Bouchet et al 2012)
- Cell wall candidate genes
- Planing to increase marker density through GBS

 $\circ$  Main limitation of this population

• Flowering date variability and segregation of dwarf genes

## Association mapping for cell wall related traits (3)

 $\odot$  Development of 2 association mapping populations

• Flowering under Southern France climatic conditions

• Photoperiod sensitive population, « non flowering » (biomass production optimization)

- 200 accessions per population
- panel definition is on-going
- Top cross evaluation

• Will be evaluated under non-limiting and limiting water availability (trials from 2014 to 2017)



S Champion, 2012

#### MARS for biomass production (1)

 $\circ \mathsf{Two} \ \mathsf{goals}$ 

•Decipher the genetic determinism of biomass yield and composition in elite crosses

Select new elite B and R Parents



### BCNAM for biomass production (1)

•Several constraints on the B pool side

- seed production
- short stature
- Low variability of available B lines regarding biomass composition

• A large set of applications for sorghum biomass with a limited understanding of the key phenotypic traits



• Need to increase the variability of biomass composition in elite B parents

•Same strategy as the one used by Deedi (Adapted parent = currently available B elite, Undadapted parent = genotype harbouring different biomass composition and structure. BC scheme to introgress new alleles / traits in elite B background)

•2 elite B genotypes x 10 B accessions harboring a high biomass composition variability





•Development of 20 populations

•Target of 100 BC1F4 per population



#### BCNAM for biomass production (2)

•B pool

•2 RP = elite parents

•10 DP

•100 BC1F4 families per F1

•ms3 conversion of RPs is on-going

•Partnership with 2 French breeding companies : Eurosorgho and RAGT

•Field trials of BCNAM population in 2018