



Plant & Animal Genomes XVIII Conference

January 9-13, 2010
Town & Country Convention Center
San Diego, CA

W144 : Challenge Program

A GCP Challenge Initiative: Drought Tolerance Improvement For Sorghum In Africa

Jean-Francois Rami¹, Niaba Teme², Michel Vaksman^{1,2}, Denis Lespinasse³, Claire Billot¹, Sophie Bouchet¹, C Tom Hash⁴, Santosh P Deshpande⁴, Punna Ramu⁴, S Senthilvel⁴, Hari D Upadhyaya⁴, Eva Weltzien⁵, H Fred W Rattunde⁵, David Jordan⁶, Andrew Borrell⁶, Andrew H Paterson⁷, Stephen Kresovich⁸, Jean-Christophe Glaszmann¹, Oumar Niangado⁹

¹ Cirad, TA 40/03, Avenue Agropolis, Montpellier, 34398 France

² IER, Station de Sotuba, PO Box 258, Bamako, Mali

³ Syngenta Seeds, 12 chemin de l'Hobit, BP27, 31790 Saint Sauveur, France

⁴ ICRISAT-Patancheru, Hyderabad 502 324, Andhra Pradesh, India

⁵ ICRISAT-Samanko, Bamako, Mali

⁶ QPIF Hermitage Research Station 604 Yangan Road Warwick Q 4370, Australia

⁷ University of Georgia, Athens, GA 30605

⁸ University of South Carolina, Columbia, SC 29208

⁹ Syngenta Foundation, Bamako, Mali

Sorghum is, together with pearl millet, one of the most important cereals in West Africa. It is the second most important crop in Africa after maize. Sorghum production in West Africa is principally based on traditional, low harvest index cultivars and breeding efforts of the past 40 years have had limited positive impact. At the same time, sorghum with an aligned genome sequence available since 2007, constitutes a model for grass species and is rich of huge resources in terms of genomic tools and information.

Building on a five-year effort to characterize worldwide sorghum diversity and develop resources for association mapping studies, several approaches are now explored for integrating molecular tools and approaches into sorghum breeding programs in Mali. This presentation will focus on two approaches developed as part of the GCP challenge initiative "Drought Tolerance Improvement for Sorghum in Africa". The first strategy integrates recent sorghum breeding achievements in Mali and methodologies for marker-assisted recurrent selection (MARS) that provide significant improvement of breeding efficiency for complex traits, as demonstrated in maize. The second, develops a modified nested association mapping (NAM) design exploiting backcross products from a set of elite recurrent parents in combination with several genetically diverse donor parents chosen as sources of cryptic alleles for improvement of productivity and adaptation to prevalent biotic and abiotic stresses. This project will combine an applied component toward the development of new broadened basis varieties with the development of experimental populations with strong genetic resolution and long-term value for identifying marker-trait associations.

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