Proceedings of the LXVI SIGA Annual Congress
Bari, 5/8 September, 2023
ISBN: **978-88-944843-4-2**

Oral Communication Abstract – 4.01

TARGETING ROOT TRAITS TO IMPROVE TOLERANCE TO VEGETATIVE DROUGHT EPISODES IN PEARL MILLET (PENNISETUM GLAUCUM L.)

AFFORTIT P.*, FAYE A.**, JONES D.***, BENSON E.****, BURRIDGE J.*, SINE B.**, ARENAS-JIMENEZ S.*, NAKOMBO-GBASSAULT P.*, BHOSALE R.*****, PRIDMORE T.****, VADEZ V.*, KANE N.**, BENNETT M.*****, LAPLAZE L.*, WELLS D.***, ATKINSON J.***, GRONDIN A.*

*) UMR DIADE, French Research Institute for Sustainable Development (IRD), France
**) CERAAS, Institut Sénégalais des Recherches Agricoles (ISRA), Senegal
***) Integrated Phenomics Group, School of Biosciences, University of Nottingham, United Kingdom
****) School of Computer Science, University of Nottingham, United Kingdom
*****) Future Food Beacon of Excellence and School of Biosciences, University of Nottingham, United Kingdom

food security, root architecture, transpiration efficiency, root architecture, root anatomy

In West Africa, cereals production per capita is declining due to the fast growth in population outpacing the increase in food production. Moreover, several models predict that global changes will reduce cereals yield in this region. To achieve future food security, it is therefore necessary to improve productivity and resilience through the combined development of adapted varieties and agricultural practices. Pearl millet is a key cereal for food security in sub-Saharan Africa. It is mostly grown in areas with limited agronomic potential characterized by low rainfall and low-fertility soils. Moreover, it lags behind other crops in its genetic development and its average yields remain low.

Root traits represent potential new targets for breeding pearl millet varieties more resilient to abiotic stresses and more adapted to future climate scenarios. To better understand how root traits influence water stress tolerance in pearl millet, a panel of 160 newly re-sequenced inbred lines was grown under irrigated and vegetative drought stress over two

years in field conditions in Senegal and was phenotyped for root architectural and anatomical traits, as well as leaf ion content and yield and yield components traits. We observed a large diversity of response to drought stress in this panel, for root traits but also for biomass and yield stress tolerance indexes in particular. Root traits associated with tolerance to vegetative drought stress were identified. Association genetics was used to identify candidate genes controlling these traits. Further physiological and genetic dissection of these traits and how they relate to water uptake and use is underway. It could provide new avenues to improve drought tolerance in pearl millet.