Proceedings of the SIGA Young Web Meeting
7 July, 2020
ISBN **978-88-944843-0-4**

Oral Communication Abstract – SY11

DATA-DRIVEN DECENTRALIZED BREEDING INCREASES GENETIC GAIN IN CHALLENGING CROP PRODUCTION ENVIRONMENTS

DE SOUSA K.*,**, VAN ETTEN J.*, POLAND J.***, SOLDBERG S.Ø.**,
JANNINK J.-L.****, FADDA C.*, PÈ M.E.****, DELL'ACQUA M.*****

*) Bioversity International
**) Inland Norway University of Applied Sciences
***) Kansas State University
****) Cornell University
*****) Scuola Superiore Sant'Anna

Crop breeding must embrace the broad diversity of smallholder agricultural systems to ensure food security to the hundreds of millions of people living in marginal production environments. This challenge can be addressed by combining genomics, farmers' knowledge, and environmental analysis into a data-driven decentralized method called 3D-breeding. We tested this approach with durum wheat (*Triticum durum* Desf.) in 1,165 farmer plots distributed across the Ethiopian highlands. We found that 3D-breeding could double the accuracy of the benchmark representing genomic selection applied to conventional breeding. 3D-breeding could identify genotypes with enhanced local adaptation providing consistent yield advantages across seasons and locations. We propose 3D-breeding to leverage the diversity in farmers' fields to change the paradigm of plant breeding for local adaptation in a changing climate.