

## **Phenotyping root development in pearl millet, an orphan cereal from arid regions**

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Pearl millet is a subsistence cereal crop well-adapted to drought and poor soils. It plays an important role in food security in tropical arid and semi-arid regions. Root architecture contributes to pearl millet adaptation to drought and poor soils and could be a target for selection. Little is known about the cellular and molecular mechanisms controlling it. To characterize pearl millet root development, we tested several phenotyping techniques. The RootTrace facility (University of Nottingham) was found suitable for high-throughput phenotyping of early root growth. In a pilot experiment we found that root characters are highly variable between varieties in this system and that root traits show a high heritability. We will therefore use RootTrace to characterize the early root growth phenotype of a set of 120 pearl millet inbred lines and search for genomic regions controlling root traits through genome wide association studies (GWAS). In addition, we used a rhizotron system for a more detailed analysis of root system architecture establishment over a longer time period. We are also interested in the influence of abiotic and biotic factors on pearl millet root system. We therefore used X-ray micro-computed tomography to study the impact of drought stress and mycorrhization on pearl millet early root growth in soil. The results of these different approaches will be presented.