Tropentag, September 20-22, 2023, hybrid conference

"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Screening of sorghum hybrids for carbon sequestration potential under optimum irrigation and drought stress

Amna Eltigani, Lorenz Kottmann

Julius Kuehn Institute (JKI), Inst. for Crop and Soil Science, Germany

Abstract

A significant amount of soil C can be captured by agricultural ecosystems through plant roots and harvest residues (humus formation). Crops characterised by large and deep root system such as sorghum (*Sorghum bicolor* L.), has high soil C input. Sorghum cultivation can contribute to improving soil organic C, therefore, climate protection. In Germany, the cultivation of sorghum is limited despite its suitability and competitiveness with other C4 crops such as maize. Moreover, sorghum cultivation in Germany is expected to increase under future climate scenarios of recurrent heat and drought events. In Germany, little is known about sorghum genotypes that are suitable for the local conditions. In this project, we will screen 10 sorghum hybrids for their biomass production and potential for C sequestration under drought stress in Braunschweig, Lower Saxony.

Sorghum phenotyping for biomass production and potential for C sequestration will be conducted under optimum irrigation and drought stress conditions. Ten sorghum test hybrids in addition to commercial sorghum and maize cultivars used as references will be screened under laboratory, greenhouse, and field conditions. We will assess crop phenological, morphological, and agronomic parameters. Furthermore, we will perform root sampling, as well as chemical analysis of plant tissues.

We expect that the sorghum hybrids will show various phenotypes and consequently various potentials for biomass production and soil C input under both optimum irrigation and drought stress conditions. Our results are expected to identify sorghum hybrids that are suitable for cultivation in German light soils susceptible to drought such as those present in Braunschweig.

Keywords: Above-and belowground biomass, cultivation, hybrids, root system, soil carbon sequestration, soil organic carbon, sorghum

Contact Address: Amna Eltigani, Julius Kuehn Institute (JKI), Inst. for Crop and Soil Science, Bundesallee 58, 38116 Braunschweig, Germany, e-mail: amna.eltigani@julius-kuehn.de