Tropentag, September 17-19, 2014, Prague, Czech Republic

"Bridging the gap between increasing knowledge and decreasing resources"

Potential of Rhizobacteria for Promotion of Sorghum Growth and Suppression of *Striga* Development

Lenard Mounde, Michael Yongha Boh, Marc Cotter, Joachim Sauerborn

University of Hohenheim, Inst. of Plant Production and Agroecology in the Tropics and Subtropics, Germany

Abstract

The objective of this study was to screen the potential of four rhizobacteria strains for growth promotion in sorghum (*Sorghum bicolor*) and suppression of *Striga hermonthica* development. Plant growth promoting rhizobacteria (PGPR) *Bacillus subtilis* Bsn5, *B. subtilis* GBO3, *B. amyloliquefaciens* FZB42 and *Burkholderia phytofirmans* PsJN were evaluated under controlled environmental conditions in a growth chamber. Two day-old sorghum seedlings and preconditioned *Striga hermonthica* seeds were placed in fiber glass filter papers (20×6 cm length and width and respectively) between a transparent plexiglas lid and a PVC root chamber ($20 \times 6 \times 2$ cm length, width and depth, respectively) , allowing the observation of sorghum roots and the *Striga* underground stages. The chambers were filled with sterilized sand. Each plant received prepared PGPR inoculum according to treatments. Blank ringer solution was used as control. The effect of PGPR on sorghum plant height, SPAD chlorophyll value, dry biomass yield, *Striga* germination, attachment and tubercle development was analysed after 28 days. Sorghum plants treated with PGPR were significantly ($p < 0.05$) taller with relatively higher SPAD chlorophyll values and dry biomass yield in the controlled treatment compared to the treatments where *Striga* as root parasite was added. Compared to the control treatment, *Striga* seed germination was by 18 and 14 % significantly lower in the *B. subtilis* GBO3- and *B. amyloliquefaciens* FZB42-treated plants, respectively. Of the germinated *Striga* seeds, the percentage that attached to the sorghum plant was least (23 %) in the *B. subtilis* GBO3-treatment compared to all other treatments. *Striga* tubercle death percentages in PGPR treatments ranged between 35 and 59 % compared to <3 % in control plants. This study identified *B. subtilis* GBO3, and *B. amyloliquefaciens* FZB42) and *Burkholderia phytofirmans* PsJN as having the highest potential in both sorghum growth promotion and *Striga* suppression abilities. It is recommended their mechanisms of growth promotion and *Striga* suppression be investigated in future studies.

Keywords: Biological, host-parasite interaction, hyperparasite, plant growth promoting rhizobacteria, weed control

Contact Address: Lenard Mounde, University of Hohenheim, Inst. of Plant Production and Agroecology in the Tropics and Subtropics, Garbenstrasse 13, Stuttgart, Germany, e-mail: moundel05@yahoo.com