

Title: Effect of *Bacillus* isolates on plant growth promotion of *Panicum maximum* Jack under drought conditions.

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Abstract

Prolonged drought conditions represents a stress for pastures, which decreases its vegetal biomass, and is critical for animal feeding and sustainability of livestock production. Rhizosphere bacteria associated to these pastures might alleviate the stress and promote the growth of plants under hydric deficit conditions. The goal of this study was to assess the effect of rhizosphere bacteria associated to *Panicum maximum* Jacq on the growth of this plant under drought conditions. Three isolates belonging to the *Bacillus* genus (XT13, XT14 and XT38) and their mixtures (XT14+XT13, XT14+XT38, XT13+XT38 and XT13+XT14+XT38) were inoculated thirty days after plants of *P. maximum* emerged. The inoculated plants were irrigated with 50% of field capacity water content of soil (FCWC). As controls, two treatments without inoculation were performed, one of them was irrigated with 50% of FCWC, and the other with 100% of FCWC. We measured plant growth and turgor during 64 days after inoculation at five different time points, and statistically analyzed by ANOVA and HSD Tukey's test. We found that 64 days after inoculation length and turgor of non-inoculated plants irrigated at 100% of FCWC did not exhibit any difference with bacterial treatments at 50% of FCWC ($p>0.05$), which indicates that bacteria improve plant turgor through still unknown mechanisms. These results suggest that the *Bacillus* isolates could at least partially alleviate plant stress due to drought conditions. Further research, however, will allow to find microorganisms with higher potential to mitigate this increasing worldwide concern and formulate new strategies to improve crops productivity in stressing environments.

Keywords: Drought stress, plant growth-promoting bacteria, *Bacillus*.

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