

EFFECT OF AN ENDOPHYTIC FUNGUS ON ENHANCING DROUGHT TOLERANCE IN CHILLI (*Capsicum annum* L.)

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Enhancing commensalistic relationship of crops and endophytic fungi (EF) can deliver drought mitigating responses. Altered biochemical pathways of aminocyclopropane-1-carboxylate deaminase (ACCD) induction by EF minimizes ethylene production in roots and mitigates drought impact. This study explored the effect of EF on drought tolerance and growth promotion of chili as a model crop under simulated drought conditions. The experimental design was laid out on a three-factor factorial, completely randomized design. Three factors were drought levels, application of the endophyte, and soil status (sterilized or not) with 12 treatments and four replicates. Drought was induced at the flowering stage for 9 days by using a PEG 8% solution and increasing the irrigation interval up to 12–14 days. An EF isolated from a mangrove plant: *Avicennia marina* (Forssk.) Vierh. was the inoculum. The EF was inoculated into plants through soil application at a density of 1×10^6 spores mL^{-1} , twice: before and after transplanting. Plant vegetative growth was measured at weekly intervals for a 2-month period. The cross colonization of EF as assessed by investigating root colonization by EF was 100%, while the fungal density in soil was 6.3×10^3 CFU mL^{-1} . The General linear mixed model (PROC mixed) and categorical data models (PROC CATMOD) were used to detect treatment effects. The growth until drought induction in EF-inoculated and non-inoculated plants was similar, while growth of plants from sterilized seeds was significantly higher. Vegetative growth and reproductive growth including the number of flowers, number of pods, and flower-to-pod ratio after drought induction were similar compared to the well-watered plants, irrespective of the drought induction and soil status when EF was added. This study shed the first light on the potential of using EF for drought mitigation on chili, which delivered effective cross colonization of EF in arable soils, mitigating drought impacts on growth and development.

Keywords: CFU value, Cross colonization, Drought induction, Endophytic fungi inoculation