Occurrence of Arbuscular Mycorrhizal Fungi (AMF) and Dark Septate Endophytes (DSE) Associated with *Eragrostis tef*

Gezahagn Getachew, Hans Sandén, Boris Rewald, Yosef Delelegn and Douglas L. Godbold
Institute of Forest Ecology, BOKU

Background

Teff (*Eragrostis tef* (Zucc.) Trotter) is a tropical and sub-tropical crop and a staple food for Ethiopia. Arbuscular mycorrhizal fungi (AMF) are most important for plant nutrition, eg. mobilizing phosphorus under nutrient limited conditions and thus enhancing above ground biomass. Dark septate fungi (DSE) are a group of endophytic fungi characterized by their morphology of melanized septate hyphae and microsclerotia and acting either parasitic, neutral or symbiotic. This pot experiment was conducted to determine the occurrence of AMF and DSE on roots of *Eragrostis tef* and AMF spores occurrence in the soil.

Research question

Is AMF and DSE occurrence affected by N-P fertilizer and inoculation with forest soil?

Material and Methods

Top rhizosphere agricultural and forest soils were collected from Tara-gedam, Gelawdiwos and Injibara sites in western Amhara region, Ethiopia. The pot experiment was laid out in block design within the location where the soil was taken and had five replicates per treatment for a lengthy of four months. Three treatments were established; teff planted on agricultural soil with out any input, teff planted on agricultural soil with forest soil inoculum, and teff planted on agricultural soil with urea and di-ammonium phosphate fertilizer (40 kg/ha rate of N and 26 kg/ha rate of P). Before plant senescence, teff roots were removed from the soil and stained to observe AMF and DSE (Vierheilig and et al., 1998). Colonization rate was calculated according to (McGonigle and et al., 1990). AMF spores were extracted from soil according to Brundrett and et al., (1996).

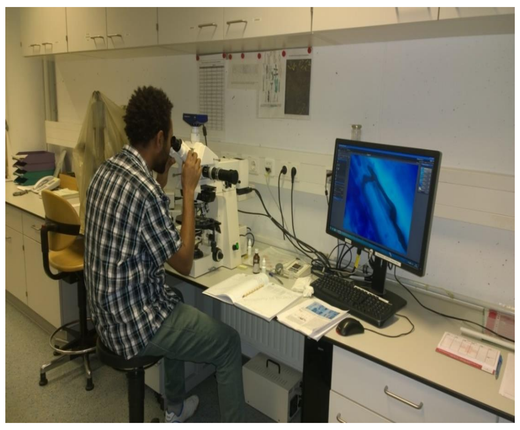

Figure 1: ***Eragrostis tef*** **(left), and estimation of AMF and DSE colonization (right)**

Results

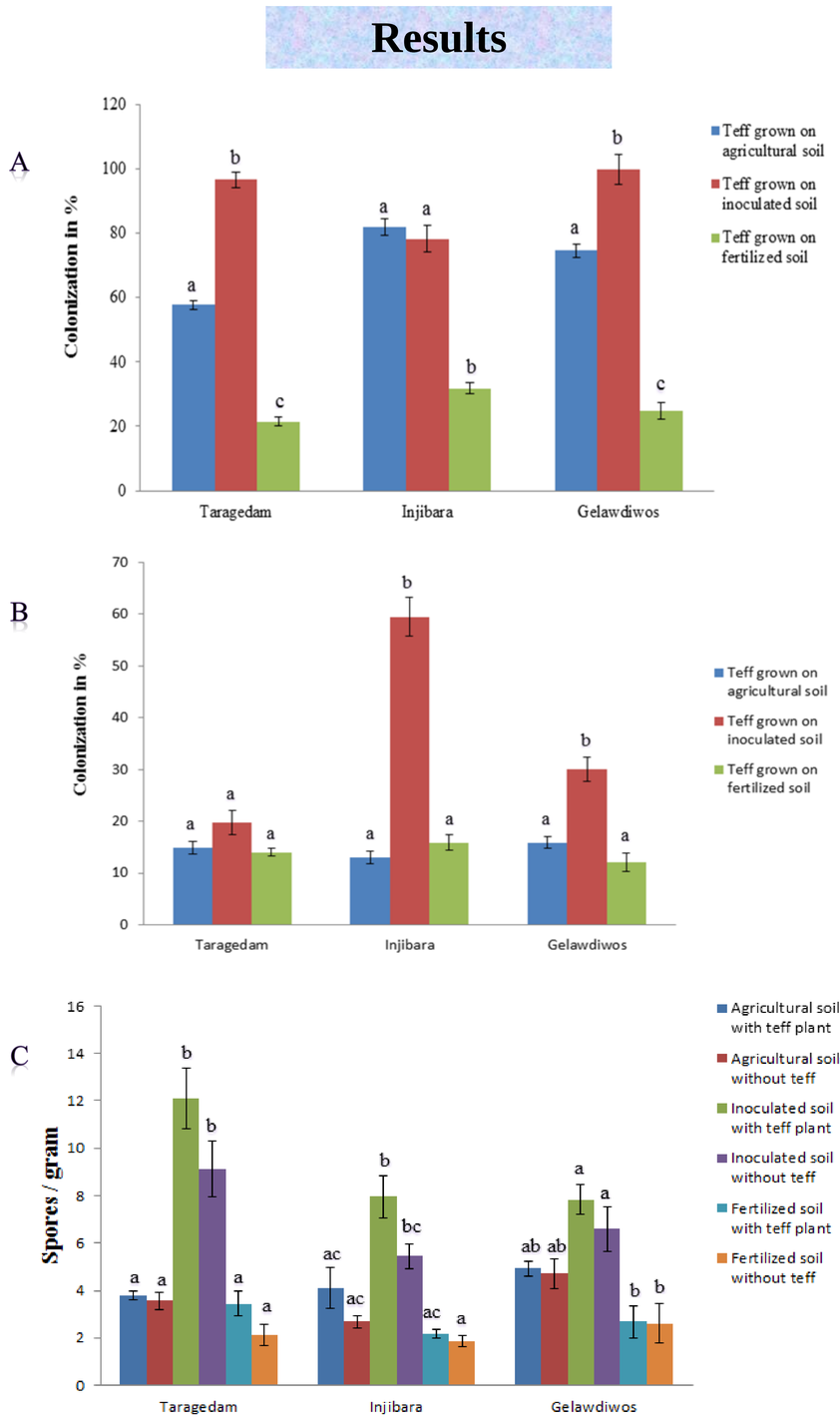

Figure 2: A) AMF colonization B) DSE colonization and C) AMF spore density; Different letters indicates significant difference between treatments of within a location (P <0.05)

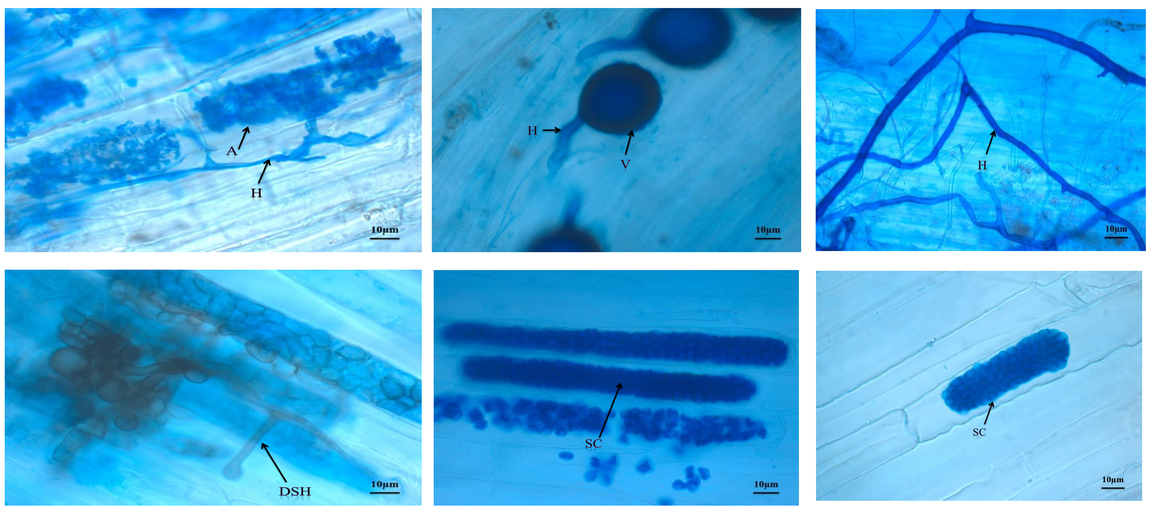

Figure 3: AMF and DSE structures; A-arbuscules, V-vesicles, H-AMF hyphae, SC-sclerotium and DSH- dark septate hyphae; bar = 10 µm

Conclusion

Inoculation of farm land with forest soil enhanced the colonization rate of AMF and DSE in *Eragrostis tef* roots. AMF occurrence was reduced by the addition of N-P fertilizer. Spore density was increased by the addition of forest soil and by sporulation of *Eragrostis tef*.

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