

DI 07 Effects of mycorrhizae as a substitute for inorganic fertilizer on growth and yield of Soybean (*Glycine max*), and soil microbial activity

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The present study was conducted to compare the inorganic fertilizer with mycorrhizae on the growth, soil microbial activity and yield of Soybean (*Glycine max*) to develop a better fertilizer combination. As treatments, inorganic fertilizer at recommended level without mycorrhizae (T1); others with standard dose of mycorrhizae and 1/2 inorganic fertilizer (T2); and 1/4 Inorganic fertilizer (T3); and without inorganic fertilizer (T4) respectively were used. Completely randomized design with four treatments, replicated six times was used under house condition for this study. There was no significant difference between T1 and T2 for all parameters measured. The highest root length (20.6cm) was recorded in T4 and it was not significantly different with other treatments. All other parameters of T4 were significantly different from T1. Highest pod wet weight (17.61g/plant) in soybean was recorded under T1, but highest pod dry weight (7.53g/plant) and seed dry weight (6.67g/plant) were recorded under T2. Soil microbial activity before initialization (M1) (219.5 CO₂ mg/kg of soil) and after initialization of mycorrhizae (M2) (573.4 CO₂ mg/kg of soil) was significantly different as M2 was 161% higher than M1. The highest soil microbial activity was recorded in T4 (461.5 CO₂mg/kg of soil) and the lowest was recorded in T1 (286.5 CO₂ mg/kg of soil) and 61.1% difference noted. The microbial activities of soil micro-organisms were lower in soils treated with inorganic fertilizers. It can be concluded that T2 (1/2 Inorganic fertilizer with standard dose of mycorrhizae) is the best fertilizer mixture for the growth and development of Soy bean. T2 plants produced less succulent tissues than T1. Hence plants in T2 may be more resistant to pest and diseases than plants in T1. By appropriate mixing of mycorrhizae to potting mixture increases the soil microbial activity significantly.

Keywords: Mycorrhizae, inorganic fertilizer, Soybean