Theme 1
Status and trends of global soil nutrient budget

Native arbuscular mycorrhizal fungi of salt affected soils: an alternative for enhancing P-nutrition and salt stress tolerance in crops

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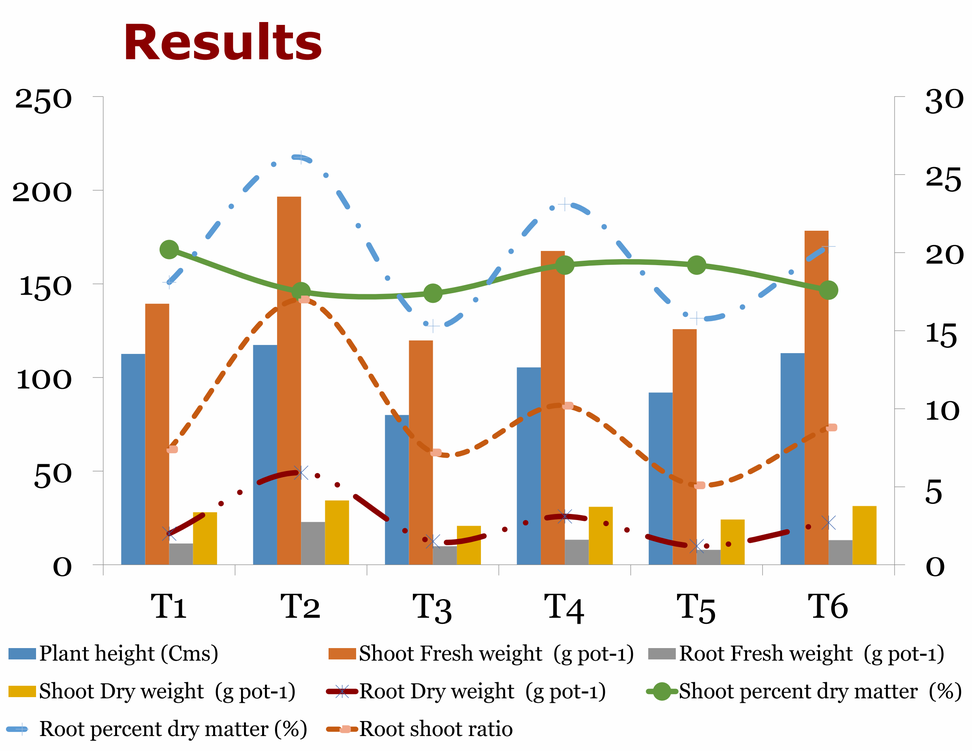
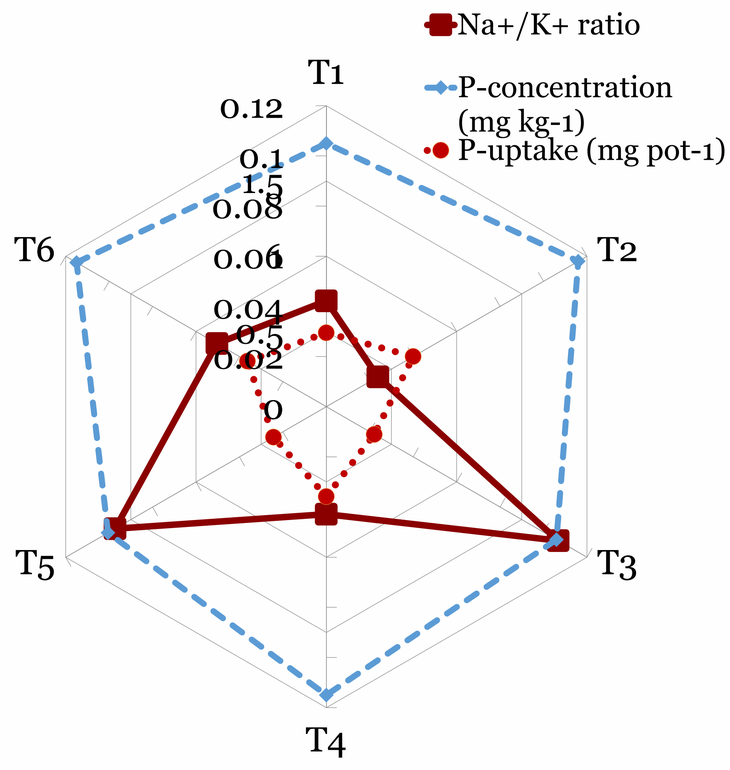
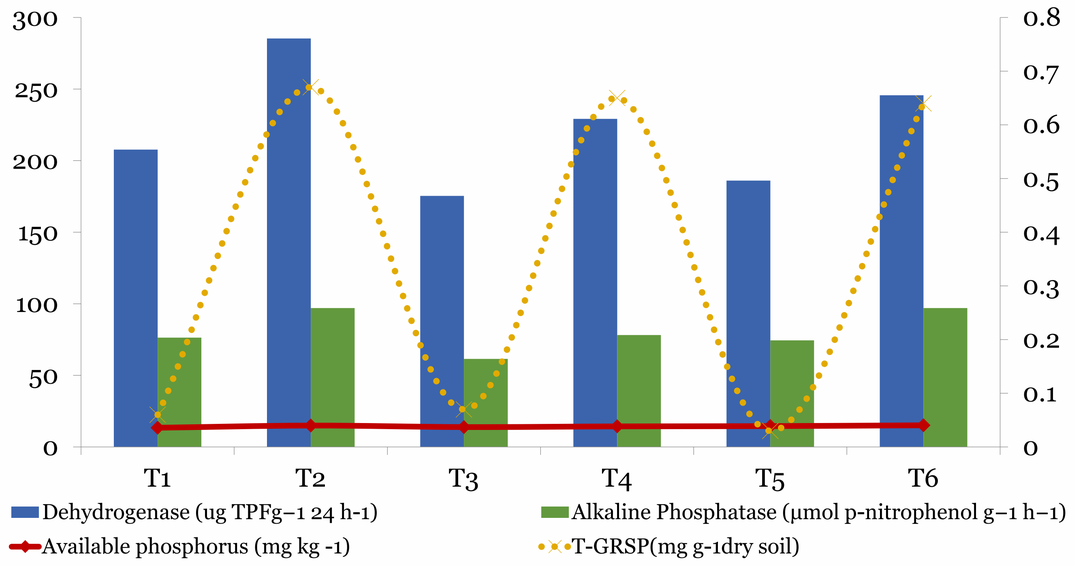
Introduction

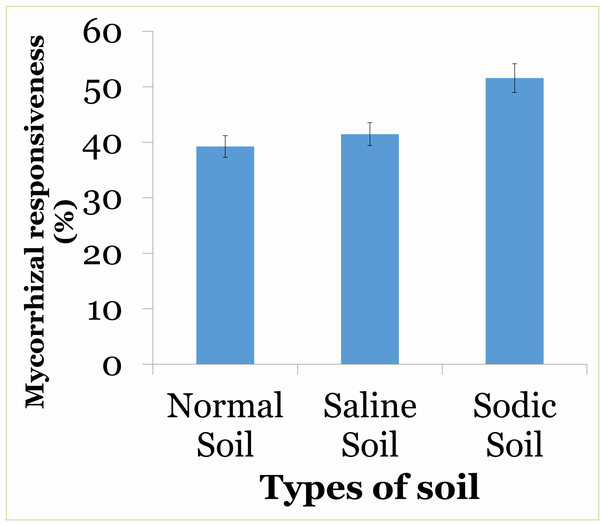
- Salt-affected soils (SAS) are the degraded soils with excessive soluble salts and exchangeable sodium.
- Contains high osmotic and matric stress for crop plants
- Arbuscular mycorrhizal symbiosis, improves water and nutrient acquisition
- Enhances plant strategies to cope with abiotic and biotic stresses.
- The present study was started with the hypothesis that under stressed conditions the symbiotic relationship between adapted native AMF and sorghum crop will result in increased productivity and stress tolerance.
- Hence, the objectives of our study were to (i) characterize the native mycorrhizal spores, (ii) evaluate their efficacy in sorghum under saline and sodic soils, and (iii) characterize the AMF-crop interactions in different soil types.

Results





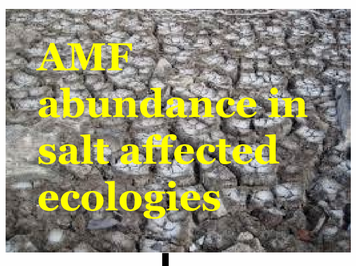




T1: Normal soil without AMF inoculation; T2: Normal soil with AMF inoculation; T3: Saline soil without AMF inoculation; T4: Saline soil with AMF inoculation; T5: Sodic soil without AMF inoculation; T6: Sodic soil with AMF inoculation.

- ✓ Improved plant height, fresh and dry biomass; Normal> sodic >saline soils.
- ✓ Root to shoot ratio highest in sodic soil following saline soils.
- ✓ The P content, P uptake, and K^+/ Na^+ were better.
- ✓ Increase in Olsen's-P; Normal> sodic >saline soils.
- ✓ High glomalin content, dehydrogenase and alkaline phosphatases enzymes.

Methodology



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Isolation of AMF using trap culture technique

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Development of Mycorrhizal inoculum

AMF Responsiveness in salt affected soils

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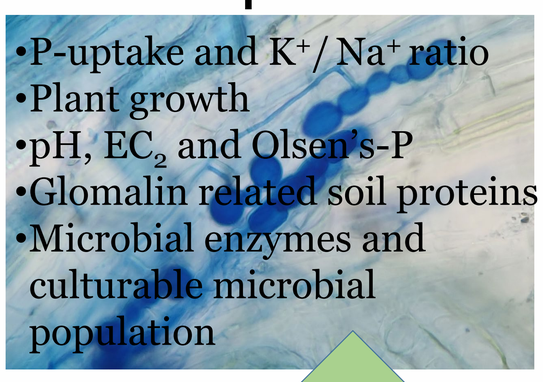
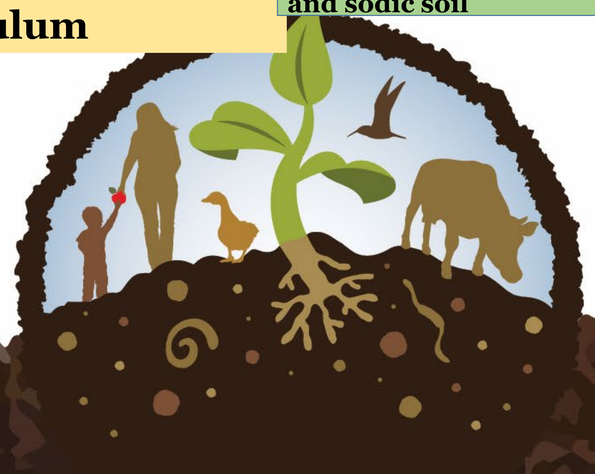


Efficacy of AMF under saline and sodic soil



Conclusions

- ✓ Abundance of native AMF depends upon the level of stress present in saline and sodic soils.
- ✓ Application of native AMF was found very effective in improving growth, yield, and P nutrition under salt-affected soils.
- ✓ The AMF partnership was equally effective in saline as well sodic soils.
- ✓ Therefore, application of such native AMF of salt affected soils could be an alternative strategy for enhancing P-nutrition and salt stress tolerance in crops under such hostile conditions.