THE INTERACTIONS AMONG PHOSPHATE-SOLUBILIZING BACTERIA, VAM FUNGUS AND ASSOCIATIVE N_2-FIXING BACTERIA AND THEIR EFFECTS ON GROWTH AND N AND P UPTAKE OF PEARL MILLET

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ABSTRACT

A pot experiment was conducted in the greenhouse to investigate the interactions of the inoculation of phosphate-solubilizing bacteria Bacillus megaterium var. phosphaticum, vesicular-arbuscular mycorrhizal fungus Glomus manihot and N_2-fixing bacteria Azospirillum brasilense and their effects on growth and N and P uptake of pearl millet (Pennisetum glaucum (L.)R. Br.) in sterilized and non-sterilized marginal soil. Shoot and root dry weight of pearl millet was improved significantly by the inoculation of B. megaterium var. phosphaticum in sterilized soil. P uptake by plants was significantly increased by the combined inoculation of G. manihot and B. megaterium var. phosphaticum. In non-sterilized soil, shoot dry weight was significantly increased by the plants inoculated with B. megaterium var. phosphaticum alone and in combination with G. manihot. No significant improvement in plant N uptake was observed by single or combined inoculation. Plants fertilized with 30 kg N ha^{-1} as starter N showed significantly increased P uptake by the inoculation of A. brasilense with G. manihot and combination of the three species in sterilized soil. In non-sterilized soil P uptake by pearl millet variety "CIVT" was significantly improved by the inoculation of A. brasilense, G. manihot and B. meguterium var. phosphaticum. Generally increasing tendency in the percentage of root infection was observed when VAM fungi was inoculated in combination with phosphate-solubilizing bacteria and N_2-fixer in sterilized and non-sterilized soils.