

MOISTURE STRESS, BRADYRHIZOBIA, VESICULAR- ARBUSCULAR MYCORRHIZA AND P-FERTILIZERS EFFECTS ON SOYBEAN GROWTH, NUTRIENT CONTENT AND PHOS- PHATASE ACTIVITY UNDER CALCAREOUS SOIL

[35]

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ABSTRACT

A greenhouse experiment was designed to study the role of vesicular-arbuscular mycorrhiza (VAM) and bradyrhizobia on soybean growth and the activity of phosphatase in soil and plant roots which were grown under water stress conditions. Soil was fertilized with either rock or super phosphate as P-fertilizer while uninoculated unfertilized soil conducted as control. VA mycorrhizal inoculation was applied in soil received rock-p fertilizer as single inoculum while dual inoculum (bradyrhizobia and VA mycorrhiza) was applied in soils received either of P-fertilizers. Data showed a significant increases in soybean shoot and root dry weights, due to inoculation with VA mycorrhiza or bradyrhizobia inoculants. Greatest values were recorded when dual inoculation in soil received super phosphate was applied, increases reached more than 167% and four folds over control when plants grown under normal and water stress conditions respectively. Nodulation was also affected by VA mycorrhizal inoculation, maximum nodules count and weight were 82 and 2.5 gm per plant respectively, when plants were grown under normal watering conditions, while under water stress plant nodulation was affecting greatly as nodules count and weight were reduced. VA mycorrhizal colonization in soybean roots was significantly increased by application of VAM inoculant or dual inoculation and seemed to be higher under water stress conditions. On the other hand phosphatase activity trend decreased under water drought conditions but increased in treatments with either VAM or dual inoculants, maximum value recorded in plant roots were 245×10^2 u mole per gm root per hour in plants inoculated with both inoculants and grown in soil received rock phosphate fertilizer under normal watering conditions. Soil phosphatase activity was found to be in the same trend of that in roots but with low values. NPK concentration and contents in soybean shoots were significantly increased due to either of P-fertilizer application or endophyte inoculation under water stress and normal watering conditions. The

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