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Effect of bioinoculants on *Phyllanthus reticulatus* Poir. a medicinal plant raised through stem cutting

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ABSTRACT

The effect of AM fungus, PSB and *Azotobacter* was evaluated on *Phyllanthus reticulatus* Poir. plants grown on sterilized soil. Plant aerial biomass phosphorus content in shoots were evaluated upon 60 day old harvested plants. Positive mycorrhizal colonization was recorded of the inoculated with *Glomus fasciculatum*. Although lower root colonization with higher P and N concentration was observed in plants treated with *Bacillus polymyxa*. Higher values of aerial biomass and plant height of the plants were seen in the treatments of co-inoculated with three organisms. The results confirms the synergistic effects between AM fungus, phosphate solubilizing bacteria (*Bacillus polymyxa*) a nitrogen fixer (*Azotobacter*) was most beneficial to plants raised through stem cuttings of *Phyllanthus reticulatus* Poir.

Key words : *Glomus fasciculatum*, *Bacillus polymyxa*, *Azotobacter* and *Phyllanthus reticulatus* Poir

INTRODUCTION

Mycorrhizas constitute a symbiotic association between the roots of a wide variety of facultative host plants and this obligate symbiotic fungi belonging to the phylum Glomeromycota, class Glomeromycetes (Schüffler *et al.*, 2001). Arbuscular mycorrhiza form universal symbiosis which can be established with over 80% of plant species, including most of agricultural crops as well as herbaceous and scrublands species in natural ecosystems (Barea *et al.*, 2005). In this association, the fungus receives part of the syntheses produced by the plant (Sanders and Tinker, 1971) and increases the root absorption area by means of the extension of the extra radical mycelium (Barea, 1991; Tarafdar and Kumar, 1996), thus allowing nutrient absorption, especially in soils with low fertility.

Most agricultural crops are potential host plants for arbuscular mycorrhizal (AM) fungi. AM fungi increase the exploitation of the soil volume by the hyphal network, which increases the active absorption surface and spread beyond the phosphate depletion zone (Martin *et al.*, 2001). Mycorrhizal hyphae have a higher affinity for phosphate as expressed in the Michaelis-Menten equation by a lower K_m value and absorb P at lower solution concentrations than roots do (Lange Ness and Vlek, 2000).

The combined inoculation of an arbuscular mycorrhiza-forming fungi and a phosphorus-solubilizing microorganism has demonstrated a better uptake both of native P from the soil and of the P coming from the phosphoric rock (Cabello *et al.*, 2005).

The aim of the present study was to evaluate the effect of AM fungus *Glomus fasciculatum*, a phosphate solubilizer *Bacillus polymyxa* and *Azotobacter* on growth of *Phyllanthus reticulatus* Poir. to study their interaction in potted green house conditions.

MATERIALS AND METHODS

Eight cm stem cutting of *Phyllanthus reticulatus* Poir. was taken from a old healthy plants grown in sterile soil with P deficiency. Each stem cutting was surface-sterilized with sodium hypochlorite (10% v/v) for 10 min and thoroughly rinsed with sterilized water. Earthen pots measuring 20×15 cm were filled with 5 kg sandy loam soil of (1:1) ratio. The chemical composition of the used soil shown in (Table 1).

The AMF strain used was *Glomus fasciculatum*. Inoculum consisted of rhizospheric soil from *Sorghum vulgare* L. plant pot culture that contained spores (10 g dry soil), mycelia and colonized root fragments were inoculated.

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