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Effect of indiginous introduced arbuscular mycorrhizal fungi and *Rhizobium* on growth of *Pongamia pinnata* Vent.

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Indigenous arbuscular mycorrhizal (AM) fungus was isolated from rhizosphere soils of *Pongamia pinnata.* Young seedlings of *P. pinnata* inoculated with indigenous AMF *Glomous fasciculatum* showed significant growth and the plants introduced with *Glomous mosseae* did not show significant effect on growth. The dual inoculation with indigenous *Glomous fasciculatum* and introduced *Glmous mosseae* depicted growth response was much greater than the single inoculation. The tripartite system of indigenous and introduced VAM with *Rhizobium phaseoli* improved significant increase plant height, plant dry matter, nodulation number, N and P content of *Pongamia pinnata* over non-inoculated plants with either AMF or *Rhizobium* alone.

Key words : *Glomus fasciculatum*, *Glomus mosseae*, *Rhizobium phaseoli*.

INTRODUCTION

The arbuscular mycorrhizal (AM) fungi can improve plant growth through increased uptake of phosphorus, especially in soils of low fertility (Smith and Read, 1997). demonstrated that several legumes grow poorly and failed to nodulate in autoclaved soil unless they were mycorrhizal. This was probably due to phosphorus deficiency since an adequate phosphorus supply is important for satisfactory nodulation and nitrogen fixation (Bali *et al.*, 1987). Inoculation of crop plants with VA-mycorrhizal fungi and *Rhizobium* has been found to have synergistic beneficial effect on nodulation, nitrogen fixation and plant growth (Bhagyaraj *et al.*, 1984; Banwarilal *et al.*,1990; Lakshman, 1998). Most agricultural soils possess an indigenous VAM spore strains, the role of which in crop productivity has been examined in sufficient details (Tilak, 1993). Therefore, a suitable host endophyte combinations, however, required to obtain the better results. This object can be achieved through a better understanding of the effectiveness of VAM fungi with *Rhizobium*.

Pongamia pinnata is a deciduous trees that grows to about 15-20 meters in height. The tree is well suited to intense heat and sunlight withstanding temperatures slightly below 0^0C to 50^0C and annual rainfall of 5-25 cm and it grows well on sandy and volatile lime stone. Its oil is used for lubrication and indigenous medicine. Its roots make it valuable for checking erosion and stabilizing dunes.The present study was aimed for examining the role of indigenous VAM fungi on growth of *P. pinnata* and evaluating their interaction with introduced *Glomus mosseae, Glomus fasciculatum* and *Rhizobium phaseoli*.

MATERIALS AND METHODS

Field survey was carried in different locations of *Pongamia pinnata* growing in botanical garden of Karnatak University ,Dharwad. Minimum eight rhizoshperic soil samples and twenty five roots were collected from each individual plant. A summary of the analytical details of the botanical garden soil consist of; pH : 6.7, organic matter : 1.92(%), total nitrogen : 719 (ppm), total phosphorus :394(ppm) and total potassium : 663(ppm). Randomly selected root samples were cut into 1cm segments and cleared with 10% KOH and stained with 0.05% tryphan blue in lactophenol, following the procedure of Phillips and Hayman (1970) and percentage of root length by Giovanetti and Mosse (1980). The number of VAM spores per 50g. soil was calculated by adopting the procedure of wet-sieving and decanting technique (Gerdemann and Nicolson, 1963). Identification of VAM fungal species was done following the keys suggested by Schenek and Perez (1990).

The soil used in pot experiments was a phosphorus deficient 2.5 ppm available extracted with NH_4F+HCL sandy loam, pH 6.8. Two-day-old seedlings were transplanted in pots containing 6 kg soil, which was sterilized in 5% methyl bromide. Four triplicate pots were

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