Growth of Nursery Grown Micro Propagated Bamboo (*Bambusa Tulda* .L) Inoculated with Arbuscular Mycorrhizal Fungus and Plant Growth Promoting Rhizobacteria (PGPR)

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KEYWORDS : *Azospirillum,Frateuria, Glomus*, PGPR

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ABSTRACT

A nursery experiment was conducted to investigate the effect of bioinoculants AMF (Glomus mosseae) Frateuria aurantia (potassium mobilizer), Azospirillium (Free nitrogen fixer) on growth promotion of micro propagated thorn less bamboo (Bambusa tulda .L).Bamboo seedlings were inoculated singly or in triple inoculation with Glomus mosseae, Frateuria aurentia and Azospirillium brasilense. The mycorrhizal spore load and per cent root colonization were maximum with triple inoculated plants and least in control and uninoculated plants.

INTRODUCTION:

Bamboo is one of the most useful groups of arborescent plants, belong to grass family Poaceae. Thornless bamboo are being introduced in India for mass plantation under agro forestry and social forestry programmes. Fruit setting in bamboo ranges from 3 to 120 years, resulting in paucity of seed. Therefore, micropropagation methods have been used (Gau etal., 1993). However, the afforestation quality of this bamboo and to optimise bamboo plantation ecosystem is still a serious problem. Phosphorous nutrition is an important factor for the proper growth of bamboo (Wexnjiang etal., 2013) while little is known about the effect of bioinoculants viz AMF and rhizomicroorganisms on the available Potassium and phosphorous absorption of bamboo commonly cultivated. Hence, the present study was conducted to evaluate the effect of inoculation with AM fungi and growth promoting rhizobacteria on growth and biomass in plantlets of *Bambusa tulda*.

MATERIALS AND METHODS:

Mycorrhizal inoculum *Glomus mosseae,* was initially obtained from D.J.Bagyaraj (Agriculture University) Bangalore. For inoculum preparation , a single colony of AM Fungus (Glomus mosseae) strain grown on sterilized sandy soil by Ragi (*Eleusine corocona*) as host plant for three months, and the mixture of spores , mycelium, soil and plant root fragmants were used as AM fungal inoculum. Six months old Bambosa tulda .L seedlings were raised by micropropagation were procured from Growmore industry, Hosur.

The experiments were conducted in replicated randomized block design with five replications for each treatments. The treatments were single as well as triple inoculation of *Frateuria aurentia, Azospirillum brasillense* at 10^9 cfu and 450-500 infectious AM fungus *Glomus mosseae* for mycorrhiza treatment was added to the appropriate pot close to the root zone 30 days after transplanting. The control received the same amount of autoclaved inoculum. The plants grew under natural conditions and the soil moisture was maintained at 75% by watering as and when necessary. The plants were harvested on 60th day and checked for root colonization. The roots were randomly sampled and cleared and stained with tryphan blue (Phillips and Hayman 1976). Per cent root colonization arbuscles and vesicles abundance were estimated (Gerdemann, etal., 1963).

Shoot number in each treatment, and height from all replicates were recorded after 6 months of plant growth. The average leaf numbers and area of one plant, from seedlings randomly recorded for the individual treatments and combined inoculations.

RESULTS

Bamboosa tulda micropropagated plants responded well to the microbial inoculants. Single inoculation of *Glomus mosseae* didnot show much significant growth. Plant height, No of leaves and branches comparatively showed significant growth than *Azospirillum brasillense* inoculated alone and control plants without any inoculation, where as triple inoculation with *Glomus mosseae, Frateuria aurentia and Azospirillum brasillens* showed significant increase in growth and biomass of Bamboo followed by Glomus mosseae and Frateuria auratia alone(Table 1).The percentage root colonization and spore count in the root zone soil were significantly higher in the triple inoculation treatment, followed by the dual and single inoculations respectively (Table 2). This indicated that the efficiency of combined inoculation over individual inoculation has enhanced growth and biomass of plants. (Lakshmipathy etal 2001), observed increased growth of *Saraca asoca* plant inoculated with *Glomus mosseae* and PGPR.

Table 1: Influence of *Glomus mossese, Frateuria aurentia, Azospirillum brasillense* on growth and biomass of micropropagated *Bambusa tulda* L.
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Treatments	Plant height (cm)	No. of branches	No. of leaves
Control	210	17.00	110
Azospirillum (Azo)	240	19.00	135
Glomus mosseae(G.m)	320	22.00	261
Frateuria aurentia (F.a)	480	32.00	335
Azo+G.m+F.a	540	70.00	705

#- Mean of 5 replication.

Table 2: Influence of *Glomus mosseae* and PGPR on mycorrhizal per cent root colonization and spore number in rhizosphere soil of micropropagated *Bambusa tulda* .L

Treatments	Mycorrhizal colonization Per cent (%)	Spore number/25g soil
Uninoculated control	42.33 [b]	119.33 [b]
Azospirillum (Azo)	58.00 [b]	189.22 [a]
Glomus mosseae(G.m)	66.42 [a]	190.33 [a]
Frateuria aurentia (F.a)	42.76 [b]	132.00 [b]
Azo+G.m+F.a	73.10 [a]	203.00 [a]

Means with same superscript donot differ significantly at P=0.05 level by Duncken's multiple range test.

DISCUSSION

Triple inoculation with *Glomus mosseae, Frateuria aurentia,*

Azospirillum brasillense were found to be superior in increasing growth and biomass of Bamboo indicating the combined effect of organism.

Positive effects largely from increasing phosphorous uptake via the mycorrhizal pathway alleviating phosphorous efficiency (Smith and Read 2008:Smith and Smith 2011). The higher potassium concentration was observed in combined inoculation. The present study also coincides with the reports of Wu etal (2005) in Maize, Medicago sativa (Khan etal 2008) Panaz ginseng (Cho etal., 2009).

Hence, the present study reveals that the co-inoculation with *Glomus mosseae, Frateuria aurentia, Azospirillum brasillense* improves the quality and biomass of micropropagated Bamboo (*Bambusa tulda*. L).

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