# COMPARISON OF DIFFERENT ORGANIC AMENDMENTS, BIOFERTILIZERS AND SYNTHETIC FERTILIZER ON SEEDLING GROWTH OF SOME DRY ZONE FOREST SPECIES IN SRI LANKA

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**Key words:** Dry zone forest tree species, arbuscular mycorrhizae, biochar, compost, "jeewaamurthum" and synthetic fertilizer

## Introduction

Dry zone forests in Sri Lanka are dry mixed evergreen forests which represents almost one third of Sri Lankan forest ecosystem. Dry zone covers northern and eastern parts of Sri Lanka. Dry zone forest contains very important species of flora and fauna. Dominant tree species of dry zone forests of Sri Lanka, such as ebony (*Diospyros ebenum*), satin (*Chloroxylon swietenia*), palu (*Manilkara hexandra*), milla (*Vitex pinnata*), halmilla (*Berrya cordifolia*) and panakka (*Pleurostylia opposita*) are luxury timber species. Wood apple (*Feronia limonia*), welang (*Pterospermum conscens*) and mylla (*Bauhinia racemosa*) are also dominant dry zone tree species. Forest cover in Sri Lanka is decreasing because of various reasons. Soil degradation or reduction of soil fertility affects the dry zone productivity (Greller and Balasubramaniam, 1980). Some seedlings of forest tree species (e.g. *Manilkara hexandra*) shows seedling die back. Therefore, it is immensely important in regenerating and protecting forest cover in the dry zone of Sri Lanka. Soil fertility helps to improve the successful seedling growth and establishment of forest tree species. Therefore, finding the way of successful growth and establishment of seedlings of tree species will be most important in forest regeneration programs in dry zone of Sri Lanka. The main objective of the present study is to compare the effects of arbuscular mycorrhizae, "jeewaamurthum", compost, biochar and synthetic fertilizer on seedling growth of common dry zone tree species in Sri Lanka. The specific objectives are to compare the efficiency of infecting arbuscular mycorrhizal fungi with each organic amendment and synthetic fertilizer with thriving soil microbial counts.

## Methodology

Pot experiment was carried out at the plant house situated at the plant house at Rajarata University of Sri Lanka, which was located in dry zone of Sri Lanka. Seeds of four dry zone forest tree species such as *Manilkara*

*hexandra*, *Feronia limonia*, *Bauhinia racemosa* and *Pterospermum conscens* were used. Control and ten other treatments were applied in Randomized Complete Block Design with four replicates. Field soil only as control, arbuscular mycorrhizae, compost, "jeewaamurthum" and synthetic fertilizer as single treatments with field soil, combinations of all those with arbuscular mycorrhizae and all components together as total were The significant treatment effects were determined in selected plant species ($P<0.05$) except *Bauhinia racemosa* ($P=0.10$) for relative growth rates. Further, performed *Kruskal-wallis* test revealed that AMF with compost treatment was shown highest rank of relative growth rates for *Manilkara hexandra* and *Feronia limonia* while for *Bauhinia racemosa* highest rank of relative growth rate was estimated in AMF added treatment, although the effect was not significant. Addition of the compost might enhance microbial growth and activity resulted higher soil fertility, hence improved seedling growth (Celik *et al.*, 2004). However, shoot biomass had no significant prepared. Growth parameters such as relative growth rate, shoot dry biomass were measured after five months of sapling growth. Percentage arbuscular mycorrhizal colonization of roots was estimated following standard procedures (McGonigle *et al.*, 1990) and taken as an indicator for soil productivity.

**Results and Discussion**

treatment effect ($P>0.05$) in selected four plant species except *Pterospermum conscens* ($P=0.04$). Percentage mycorrhizal colonization has shown significant treatment effects for four selected plant species ($P<0.05$). AMF added treatment of was shown highest rank of mycorrhizal colonization for all four plant species. The inoculation of AMF at early stage of seedling development resulted in positive impact on increase seedling growth by improving soil physical and biological properties, enhancing mineral uptake and transfer of nutrients to the plant by AMF (van der Heijden *et al.*,(2006).

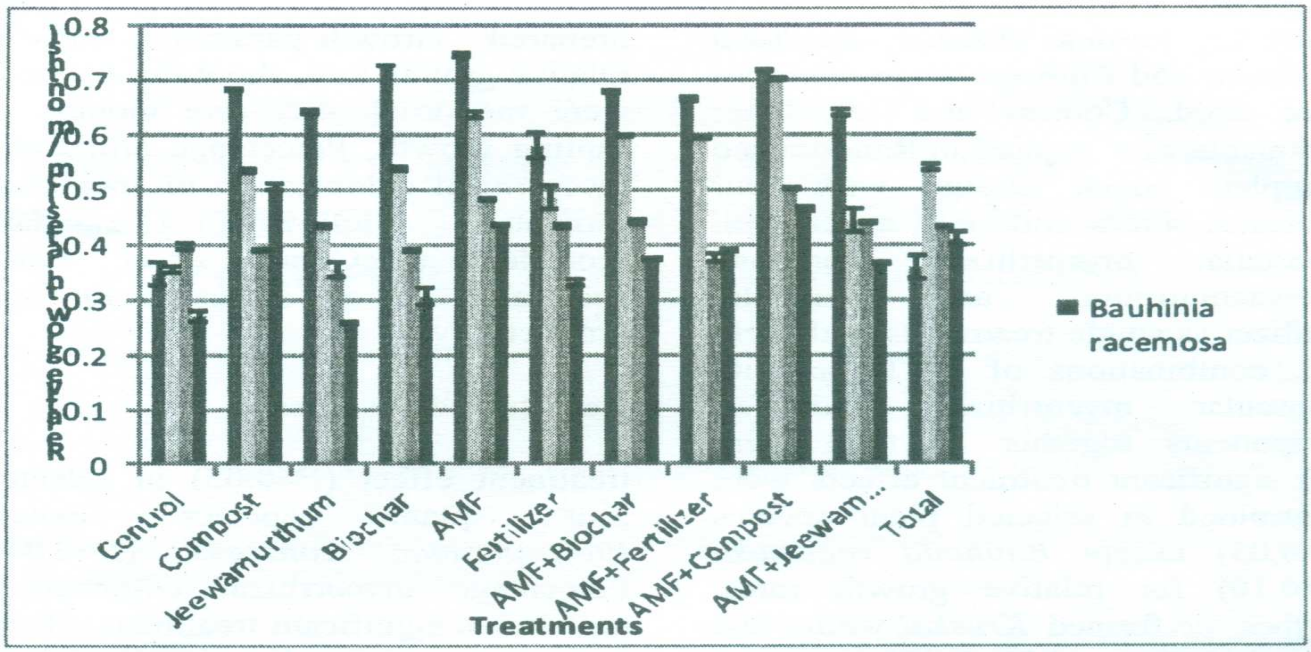


**Figure 1:** Mean relative growth rates of four dry zone tree species after four months of sapling growth in control and the other treatments of organic amendments and biofertilizers and their combinations. Error bars indicate 95% confidence intervals.

## Conclusion

Inoculation of seeds with compost and/or biofertilizers has positive impact of seedling growth and establishment. Therefore, those microbial inoculants can be used successfully in regeneration of dry zone tree species in reforestation programs in the dry zone of Sri Lanka.

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