

MYCORRHIZAE, A VIABLE ALTERNATIVE APPROACH FOR THE IMPROVEMENT OF INDEGENOUS TREE SEEDLINGS AT THE NURSERY STAGE

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2005

ABSTRACT

This study was conducted with soils obtained from a degraded area of the Supuma Forest Reserve near Okubi ó Obuasi in the Bekwai Forest District. Seeds 4 selected species (*Khaya ivorensis*, *Nauclea diderrichii*, *Terminalia superba* and *Entandrophragma angolense*) were obtained from the Supuma Forest Reserve while the Vesicular Arbuscular Mycorrhiza that was used for the study was procured from the International Collection of Arbuscular and Vesicular - Arbuscular mycorrhizal fungi (IVAM) Center, Division of Plant Science, West Virginia University, Morgan Town, 26505-6057, USA. Six hundred (600) 5×8cm polythene planting bags were each filled with 50g of bulked soil sieved prior to application of the different Treatment Protocols: Mycorrhiza inoculation alone (myc), Mycorrhiza inoculation in combination with Nitrogen (Myc + N₂), Mycorrhiza inoculation in combination with Potassium (myc + K) and sterilized uninoculated soil which serve as the growth medium for the "Control" seedlings. The Experimental Design was a Complete Randomized Block with three (3) blocks; and each Treatment Protocol had 10 replicates.

Sampling was done at bi-weekly intervals and on each sampling occasion i) Seedling height (from soil surface tip of terminal bud); ii) Stem diameter (measure at $\frac{2}{3}$ plant/seedling height using a slide caliper); iii) Number of leaves produced; iv) Leaf area and v) Chlorophyll "a" content of leaves of selected seedlings were assessed. On week 36 the root morphology were also assessed for each treatment.

Generally, seedlings of all the 4 species that received the different Treatment Protocols showed significantly higher responses in all the vegetative growth parameters that were assessed when compared to the controls.

The general trend was that the mycorrhiza inoculation in combination with Nitrogen (myc + N₂) Treatment Protocol significantly enhanced the growth of the seedlings of all the 4 species in terms of the vegetative parameters that were assessed. This was followed by the Treatment Protocol involving mycorrhiza inoculation with Potassium (Myc + K); and then that of mycorrhiza inoculation in combination with Phosphorous (Myc + P) and lastly mycorrhiza inoculation alone (Myc). In terms of response by the individual species there was no clear pattern. There were variations in the growth responses among the 4 species and on different sampling occasions. However, seedling diameter and height growth were lowest in *Entandrophragma angolense*. In all the selected species, the mycorrhiza inoculation in combination with Nitrogen (myc + N₂) Treatment Protocol also enhanced the production of chlorophyll in the leaves of the seedlings.

It is concluded that mycorrhiza inoculation in combination with Nitrogen (myc + N₂) appeared to be the best of the 4 Treatment Protocols for enhancing vegetative growth in all the 4 selected species at the nursery stage. It is also concluded that soils from degraded of Supuma Forest Reserve inoculated with mycorrhiza in combination with either N₂, P, K enhances vegetative growth of seedlings better than uninoculated soil from the degraded forests sites.

SUPERVISOR

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