

B-32: Growth of *Pericopsis mooniana* as affected by inoculation with vesicular arbuscular mycorrhizae and *Rhizobium* in unsterile soil

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Extensive deforestation in Sri Lanka has led to the extinction of a number of endemic and rare species while converting the lands into unproductive lands. Nadum (*Pericopsis mooniana*) is a leguminous, endangered, lesser known tree with superior timber value. The beneficial influence of mycorrhizal fungus on plant growth and yield, resistance to drought and salinity, tolerance to pathogens, and improving the structure of the soil has been extensively documented.

Objective: To ascertain whether va mycorrhizae inoculation benefit *P.mooniana* growth, nutrient uptake, and nitrogen fixation at seedling stage.

Experimental design was complete randomized design with 4 replicates and 4 treatments i.e., uninoculated control, *Rhizobium* (R)inoculated, Vam inoculated, R+VAM inoculated. Four months old *Pericopsis mooniana* seedlings were transplanted in buckets holding 9 kg of soil with 2 seedlings per bucket. The mycorrhizal inoculum consisted of a mixture of soil/roots/spores and was applied at the rate of 300 g/bucket.

The spores were originally isolated from Badaamuwa soil (Red Yellow Podzolic) and propagated in the greenhouse using *Zea mays* as host plant. The rhizobial inoculum was prepared by growing the P₃ rhizobium strain which was isolated from the *P.mooniana* in YMB to a density of 10⁶ cells per ml and 1 ml added for each bucket. Destructive sampling was done 4, 8, and 10 months after inoculation. Height and stem diameter were measured at monthly intervals. Total biomass production, nodule dry weight, was determined after drying at 65° C for 48 h and number of nodules were recorded.

Roots were cleared and stained and colonization by VA mycorrhizae was calculated as follows; Number of infected root segments x 100 / Total number of root segments checked. Total N and P content of the plant and Zn, Mn, Cu content in the leaf tissues were measured.

Root colonization increased with time in a sigmoid way with delayed lag phase in all treatments.

The dry matter yield increased with time in a linear fashion in all treatments. The rate of increase in VAM inoculated plants however was significantly steeper than that of their controls at 8 months and 10 months after inoculation. There was no significant difference between treatments at 4 months after inoculation.

At 4 months after inoculation only the *Rhizobium* alone inoculation treatment produced nodules with significantly higher weights than the control. But during the next 4 months nodulations of VAM inoculated plants was significantly increased as shown by increased nodule dry weight, but this increase was less pronounced later, confirming earlier results.

Inoculation with VAM fungi significantly increased P and N content of the plant. Leaves of seedlings with VAM inoculation had significantly higher Cu concentration as well as Cu content and lower Mn concentration. Though the concentration of Zn in leaf tissues was not affected by VAM inoculation, total Zn content was increased which could be explained by the dilution effect. The total uptake on N, P, Zn, Cu, nodulation and host growth were highly significantly correlated ($r=0.99$ to 0.81) with the development of VAM infection during last growth stages.

The large nutrient rich seeds of *P.mooniana* make the seedling less dependent on mycorrhizae for nutrients uptake during the earlier stages of the seedling establishment. For a successful establishment, at later stages they become more VA dependent. This appeared to be related to the decline in available nutrients in the soil. It is concluded that there can be potential benefit mycorrhizae of *P.mooniana* seedlings at nursery stage.