

Dose–response effects of *Amanita hemibapha* subsp. *javanica* inoculation on growth and ectomycorrhizal colonisation of *Dipterocarpus turbinatus* seedlings

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Abstract

The effect of *Amanita hemibapha* subsp. *javanica* (ACH) on growth and root development, along with colonization of ectomycorrhizal (ECM) of *Dipterocarpus turbinatus* seedlings (DCseed) was investigated in the greenhouse involving the dose–response relationship. Four rates of inoculum 0, 20, 40 and 60 mL seedling⁻¹ were used in a completely randomized design (CRD). Seedling growth, root height, colonization by ECM and soil chemical properties were measured throughout 6 months. The soil in the field was described as being an acid clay soil that had very low available phosphorus (P), which allowed for favorable conditions for ECM-mediated nutrient acquisition. Inoculation was highly effective in enhancing seedling establishment and root development compared to the control. The 40 mL seedling⁻¹ gave the maximum total height of the seedling (69.3 ± 6.8 cm) with good growth performance and 60 mL did not provide any significant increase in total height. The fungal establishment (colonization of the ECM) has improved with increasing inoculum dose. There was a high level of correlation between epidermal colonization and root length development using correlation analysis. The results suggest that an inoculation with ECM enhances nutrient foraging and establishment of seedlings in phosphorus-limited substrates. In general, a 40 mL seedling⁻¹ operational dose was determined to be an optimum dose due to high colonization efficiency, better growth and minimal inoculum loss. The study underscores the possibility for the use of ECM as a tool for restoration of tropical forests and nursery production of *D. turbinatus* seedlings.

Keywords: *Dipterocarpus turbinatus*, Ectomycorrhiza, *Amanita hemibapha* subsp. *javanica*, Root development, Forest restoration