

Title : Relationship between mycorrhizae and native tree seedlings grown in forest restoration nurseries

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ABSTRACT

Mycorrhizal fungi are crucial for seedling growth, enhancing nutrient uptake and stress tolerance, which are vital for forest restoration. This study compares the diversity and abundance of mycorrhizal spores in soil before and after potting seedlings of three native tree species: *Phoebe lanceolata* (Nees) Nees, *Podocarpus neriifolius* D. Don, and *Elaeocarpus lanceifolius* Roxb., sourced from three nurseries: Doi Suthep-Pui National Park (DSNP), Mae Sa Mai Village (MSMV), and Doi Suthep Nature Center (DSNC). Two methods were used for spore separation: 1) isolation and counting of fungal spores from the soil, and 2) examination of arbuscular mycorrhizal colonization in plant roots, stained and analyzed for hyphal structures, arbuscules, and vesicles. Before potting, mycorrhizal spore quantity was highest in DSNP soil, likely due to the use of locally sourced soil from nearby forests, compared to the commercial soil used in DSNC. After potting, there was an increase in spore richness, likely caused by soil disturbance and altered conditions that stimulate dormant spores. The highest spore count was found in *Elaeocarpus lanceifolius* Roxb. seedlings from MSMV (106 μm , 190 spores), while the lowest was in *Phoebe lanceolata* (Nees) Nees seedlings from DSNC (250 μm , 6 spores). Species-specific differences in mycorrhizal associations may

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explain the variation in spore richness. The study found that potting seedlings increases mycorrhizal spore richness, with some species showing higher diversity. Additionally, nurseries using local soil had greater mycorrhizal genus richness, emphasizing the importance of local soil conditions in enhancing mycorrhizal diversity. These findings suggest that improving mycorrhizal management in nurseries could optimize seedling establishment for forest restoration. Future research should monitor the long-term effects of seedling planting on mycorrhizal communities in restoration areas, as well as methods for improving the quality of mycorrhizal inoculation in the nursery process.

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