

## Effects of Nickel and Inoculation with Three Isolates of Ectomycorrhizal Fungus *Pisolithus* on *Eucalyptus urophylla* S. T. Blake Seedlings

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**Abstract :** Two moderately nickel-tolerant isolates of *Pisolithus* were compared with a non-Ni tolerant isolate for the ability to increase the growth of *Eucalyptus urophylla* seedlings in the presence of nickel (Ni) in pots in a glasshouse. Seedlings, either inoculated with mycorrhizal fungi or uninoculated, were transplanted into pots containing 3 kg steam-pasteurized yellow sand amended with five concentrations of nickel (0, 6, 12, 24 and 48 mg Ni kg<sup>-1</sup> soil). Within a day after transplanting, all seedlings subjected to Ni rates greater than 12 mg Ni kg<sup>-1</sup> showed symptoms of wilting and all died within two weeks. At lower nickel concentrations, inoculation with all 3 *Pisolithus* strains increased rates of seedling survival after 12 weeks. Inoculation with all 3 isolates *Pisolithus* significantly increased the growth of plants in Ni-free soils between 2 to 4 fold dependent on isolate. However, seedlings growing in soils containing 12 mg Ni kg<sup>-1</sup> grew poorly, mycorrhizal development was inhibited and no beneficial effects of inoculation were noted. In contrast, in soils containing 6mg Ni kg<sup>-1</sup>, inoculated seedlings did not show the reduced root growth and severe toxicity symptoms (chlorosis on young leaves and shoot tips) of uninoculated seedlings. Only the Ni-tolerant *Pisolithus* strains conferred a significant growth benefit compared to non-inoculated controls, and plants inoculated with one of these strains grew twice the size as those inoculated with the other Ni-tolerant strain. Inorganic plant analysis revealed that inoculation increased plant growth through improved P uptake but did not prevent Ni uptake. However, toxicity may have been minimized by dilution due to an increase in plant biomass. The results suggest that only one of the Ni-tolerant strains of *Pisolithus* has the potential to improve the growth and survival of *E. urophylla* seedlings in serpentine soils in the Philippines.

**Keywords :** ectomycorrhizas, *Eucalyptus urophylla*, nickel tolerance, *pisolithus*

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