

SIGNIFICANCE OF SOIL BIOTA ON THE GROWTH OF SELECTED EXOTIC INVASIVE SPECIES

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Invasiveness is the ability of a species to establish and spread in its introduced range, where it can cause significant impacts on organisms that are already exist. Many external factors contribute to the successful spread of invasive species. Out of them, soil biota plays an important role. The present study attempted to assess the importance of soil biota, in particular arbuscular mycorrhizal fungi (AMF), on the growth of some common invasive species in Sri Lanka. A pot experiment was conducted under glasshouse conditions with five invasive species viz. *Clidemia hirta*, *Alstonia macrophylla*, *Clusia rosea*, *Tithonia diversifolia* and *Austroeupeatorium inulifolium*. Mycorrhizae-free seedlings were exposed to sterilize (either through adding the fungicide, Daconil or by autoclaving) or non-sterilized soils and the growth was assessed over a period of three months. At the end of the experimental period, plants were destructively harvested. Plant growth parameters and the percentage mycorrhizal colonization of roots were assessed. Seedlings of *Clidemia*, *Alstonia* and *Clusia* grew better in non-treated soils throughout the study period compared to those of fungicide-treated soils. The adverse impacts were more pronounced on *Clidemia* than that of *Alstonia* and *Clusia*. However, *Tithonia* showed almost similar growth increments in both fungicide-treated and untreated soils. In consistence with growth increments, test species showed somewhat similar effects in relative growth rate (RGR) to changes in growth increments. *Clidemia* performed well when the seedlings were exposed to non-autoclaved soils compared to autoclaved soil. Interestingly, both *Tithonia* and *Austroeupeatorium* performed even better under autoclaved soils speculating their lack of dependency on soil biota at least during the early stages of their life cycle. Except *Tithonia*, all other species allocated relatively more biomass into their roots once exposed to organism-free soils. However, the percentage root colonization of AMF vary between species (5 – 26%) and did not show compatible results with their growth performance indicating that AMF root colonization has only little significance on growth under experimental conditions. The results suggest that importance of soil biota on plant growth differed among the studied invasive species. Among tested species, *Tithonia* and *Austroeupeatorium* seem to be the least dependent on the soil biota, while *Clidemia* depends highly on the soil biota. Almost all test species seems to be highly plastic (in terms of morphologically or physiologically) when seedlings were exposed to organism-free soils which is a known trait that contributes to better performance of fast-growing invasive species in introduced ranges.