

Bioassay to Detect the Allelopathic Effects of a Concentration Gradient of Plant Extracts of Some Forest Pioneer Species

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Reforestation programmes are currently being organized worldwide as a remedy to mitigate climate change effects, and to enhance biodiversity and ecosystem processes. Selection of appropriate plant species for restoration programmes is thus a national need. *Bauhinia racemosa*, *Cassia fistula*, *Macaranga peltata* and *Tamarindus indica* are among the plant species that are commonly used in reforestation programs in Sri Lanka. The present study aims to detect seed germination and their initial growth under increased concentrations of different plant extracts of above four species based on *Brassica juncea* (L.) Czern. (Mustard – E.) seed germination bioassay. Germination of Mustard seeds and their initial growth in 0% (distilled water- control experiment) and in 1%, 5% and 10% aqueous extracts of healthy intact leaves, fallen senesced leaves and roots of above four species were examined (n=5, 20 mustard seeds per replicate) in completely randomized experimental design over 14 days. Of the examined species, senesced leaf and root extracts of *C. fistula* significantly retarded the germination of Mustard seeds ($P=0.002$, $P<0.004$ respectively) compared to the control experiment. Also, live leaf extracts of *M. peltata* retard the seed germination but only at $\alpha = 0.1$ significance level. However, 10% senesced leaf extract of *B. racemosa* ($P=0.007$) and *T. indica* ($P=0.047$), and live leaf extract of *T. indica* ($P=0.028$) significantly enhanced seed germination. Further, the senesced leaf extracts of *C. fistula* significantly retarded the growth of the radicle of Mustard seeds ($P<0.001$) but the rest of the species tended to enhance the hypocotyle or radicle growth to varying levels, especially at high (10%) concentrations of plant extracts. These imply that *C. fistula* could adversely affect the seed germination and early seedling growth of other species and therefore it is better to avoid planting the species in high densities, during restoration programmes. Further, live leaves of *M. peltata* should not be used as mulches if enhancing natural regeneration of other species is a restoration objective. However, further experiments are required to reveal the impact of these species on other native plant species under field conditions.

Keywords: Bioassay, Hypocotyle growth, Radicle growth, Reforestation, Seed germination