

Impacts of allelopathic compounds of *Prosopis juliflora* present in soil on seed germination and initial seedling growth of native dry forest plants in Bundala National Park

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Abstract

Prosopis juliflora is an alien exotic plant in many arid and semi-arid areas in the tropics such as Saudai Arabia, India and Sri Lanka. This species was introduced to Hambanthota district in the southern province of Sri Lanka in early 1950s to improve saline soils in the area but it has spread in to natural ecosystems in Bundala National Park and other areas having similar climatic conditions. *P. juliflora* produces water soluble allelopathic chemicals in its leaves, roots, pods and flowers such as L-tryptophan, Syringin and Laricresinol. This study was conducted to determine the effects of allelopathic compounds of *P. juliflora* accumulated in soil on seed germination and initial seedling growth of selected native dry forest plant species: *Bauhinia racemosa*, *Cassia occidentalis*, *Drypetis sepiaria*, *Flueggea leucopyrus*, *Manilkara hexandra* and *Salvadora persica* by keeping seeds in soils collected from natural dry forest and *P. juliflora* stand in five replicates. The experiment was extended further by mixing soil with activated charcoal which is capable of absorbing allopathic compounds. Impact on seed germination and initial seedling growth were evaluated by measuring seed germination and, shoot and root lengths using a wetted string. Percentage seed germination of *B. racemosa*, *C. occidentalis*, *D. sepiaria*, and *M. hexandra* and the root growth of all tested plant species were significantly reduced in soil collected from *P. juliflora* stand when compared with natural dry forest soil and *P. juliflora* stand's soil with activated charcoal. Addition of activated charcoal into natural dry forest soil did not show any significant impact on seed germination and seedling growth. Allopathic compounds dissolved in soil solution is taken up by plant roots, these contact with the roots before reaching shoot parts and these may be the reason for high suppression of root growth than that of shoot growth of some selected plant species. These results indicate the presence of allelopathic compounds in soil collected from the *P. juliflora* stand and these allelopathic compounds may adversely effect on seed germination and initial seedling growth of some native dry forest plant species. However, there is a variation in the sensitivity to allelopathic compounds among native dry forest plant species.

Key Words: Alien exotic plant, activated charcoal and natural dry forest soil