Distribution of mangrove species: effects of environmental variables

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Abstract

Mangroves are the rainforests by the sea and vital for healthy coastal ecosystems. Sundarbans shelters one of the most important mangrove communities of the world. The present investigation reports the distribution of mangrove species in relation to various edaphic and tidal factors. Species density, soil physico-chemical parameters and tidal inundation were explored in 40 different sites of the Lothian Island in the Indian Sundarbans. It is a small island of nearly 38 sq. km. area. Total twenty-one species (13 true mangroves and 8 mangrove associates) are recorded. One-way analysis of variance (ANOVA) revealed that tidal inundation significantly affects the density of five species. Stepwise regression of species densities with soil parameters accounts for a variation of 42% or higher. Calcium, phosphorus, nitrogen, pH, salinity and sand are important soil parameters explaining the maximum variation in species densities and therefore selected for further gradient analysis. It is revealed that species like *Aegiceras corniculatum*, *Avicennia alba* and *Heritiera fomes* have restricted distribution along these gradients, while *Avicennia marina* has wider amplitudes, being insensitive to the gradient. Maps predicting species densities and concentration of important soil parameters throughout the island were prepared with Arc GIS 8 software using a statistical method named 'kriging'. Prediction maps show very high soil salinity in the northern mudflat region where *Avicennia alba* forms a distinct monospecific seaward fringe. No other distinct zone is recognized in present investigation. A majority of the species are concentrated in the middle and southern-ridged portion of the island. It can be concluded that *Avicennia marina* has the widest ecological amplitudes; hence it does not require much site selection during reforestation programs.

Keywords