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Use of Soil Salinity and Redox Potential in Assessing Restoration Success of Mangrove Juveniles of *Rhizophora mucronata* Lam.

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ABSTRACT

Mangrove restoration has become a priority for the Sri Lankan government in its quest to provide safeguard against ocean surges though restoration success is not retrospectively monitored. The primer introduced by the Society of Ecological Restoration International (SER) is barely used in success evaluation as it is time consuming and expensive at some point. Therefore, this study aimed at testing the likelihood of using soil salinity and redox potential at 10 cm depth, as a simple proxy to measure success of *Rhizophora mucronata* mangrove juveniles. Three mangrove restoration sites namely; Panama, Panakala and Halawa (belong to dry zone) on the eastern coast of Sri Lanka were subjected to the study. Per each site, six *R. mucronata* mangrove patches i.e. same aged, three successful (>25%) and three unsuccessful patches (<10%), were selected. From each patch, 12 (twelve) soil samples were randomly collected and soil salinity and redox potential of soils were measured with a multimeter. Soil bulk density (SBD). Soil pH, soil porosity were studied additionally. Level of survival of *R. mucronata* juveniles and cumulative height were recorded for each patch and considered as response variables. Generalized Linear Model (GLM) was performed taking soil salinity and redox potential as explanatory variables. According to the results, soil parameters showed remarkable variations among the successful and unsuccessful patches. Mean soil salinity in the successful sites (8.4±2.1 psu) was significantly lower than ($p<0.05$) the unsuccessful sites (14.2±1.6 psu). On the contrary, the successful sites showed significantly higher ($p<0.05$) mean redox potential (-38±14 mV) as compared to the unsuccessful sites (-192±47 mV). GLM results indicated a significant interactive effect of soil salinity (low) and redox potential (high) on level of survival and growth performances of planted *R. mucronata* juveniles. These conditions collectively reflect soil maturity of mangrove restored sites. Therefore, we propose that interactive effect; soil salinity × redox potential, can be used as a simple, worthy proxy in evaluating success of *R. mucronata* mangrove juveniles.

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Keywords: *Soil properties, dry zone, restoration success, proxy, GLM*