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Hydraulic architecture and hydraulic conductivity of *Rhizophora mucronata* Lam. in response to water stress

Dissanayake N.P.*, Premachandra G.S.D., Kodikara K.A.S., Jayatissa L.P.

Department of Botany, University of Ruhuna, Matara, Sri Lanka

Planting mangroves out of their natural habitat (intertidal zone) cause soil water stress in mangrove seedlings. Anatomical variations in the hydraulic architecture were extensively studied. However we argue that hydraulic conductivity should also be considered for proper understanding of mangrove seedling behavior to abiotic stresses. Therefore, this study was aimed to investigate hydraulic architecture and hydraulic conductivity of *Rhizophora mucronata* Lam. seedlings in response to water stress. Twenty seven propagules of *R. mucronata* planted in pots with a prepared soil mixture were maintained in a plant house under three physiological stress levels, i.e. high salinity (35±1psu), moderate salinity (15±1psu) and fresh water (0 psu) and under three levels of physical water stress, i.e. ~25%, ~50% and ~100% of Water Holding Capacity (WHC) making three replicates per each treatment. Anatomical features and hydraulic conductivity of the seedlings in each treatment were studied by using safranin stained cross sections of stems and Choatometer (Choat et al., 2007) respectively, over a six month period (on monthly basis). Vessel density and vessel grouping index as well as vessel diameter in seedlings under high salinity and 50%WHC treatments were significantly higher (p<0.001) compared to those in fresh water, moderate salinity and 100%WHC treatments. Hydraulic conductivity of seedlings in high salinity was significantly (p<0.001) lower compared to moderate and fresh water treatments. In contrast, there was no significant difference of hydraulic conductivity of seedlings kept in 100%WHC and 50%WHC. It indicates that at 50 % WHC, seedlings can adjust their hydraulic architecture in such a way that it will not change the conductivity. Therefore, the adaptability of *R. mucronata* seedlings to abiotic stress conditions is properly described by both hydraulic architecture and hydraulic conductivity.

Keywords: *Mangroves, hydraulic architecture, hydraulic conductivity, water stress*

*Corresponding Author: nandapd@bot.ruh.ac.lk