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Growth and Survival of Mangrove Seedlings under Different Levels of Salinity and Drought Stress

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ABSTRACT

Water availability and salinity are determinants of growth, survival and establishment of mangrove species. This study aimed to compare the ability of the mangrove species to survive extreme water stress, and to determine differences in growth performance and biomass allocation between mangrove species grown in different water levels and saline conditions. Seedlings of *Lumnitzera racemosa, Rhizophora apiculata, R. mucronata* and *Avicennia marina* were used. A dry-down experiment was done to compare the ability of mangrove species from different zonations to survive drought stress by evaluating survival rates after re-watering consequent to drought exposure. The different mangrove species were grown at different water levels (dry, well-watered, flooded) and different salinity levels such as low (3-5 ppt), high (25-27 ppt) and pure seawater (32 ppt) to evaluate the growth performance and biomass allocation of the mangrove seedlings.

L. racemosa was the most drought tolerant, followed by *R. mucronata* and *A. marina* while *R. apiculata* was the most drought sensitive. There is a possibility that *A. marina* may displace the current distribution of *R. apiculata* in the middle zone while the distribution of *L. racemosa* and *R. mucronata* in the landward and middle zone, respectively could be retained. The number of leaves of *A. marina* was significantly higher than *R. apiculata* and *R. mucronata* but was only comparable to that of *L. racemosa* across all salinity levels. *L. racemosa* was only significantly different from the two *Rhizophora* spp. under pure saline treatment. Root length of *A. marina* was significantly higher than *R. apiculata* but statistically similar to *R. mucronata* and *L. racemosa*. The capacity for root growth may allow roots to exploit water from dry soils and could correspond to the drought tolerance of *A. marina, R. mucronata* and *L. racemosa*. There was no significant effect of water and salinity stresses on the biomass allocation.

Keywords: drought stress, water potential, salinity, survival