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Differences in Morphology, Physiology and Biomass Between African Baobabs from Malian Provenances under Salt Stress

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Abstract

Throughout the world, hundred million hectares or five percent of the arable land is adversely affected by high salt concentration, which reduces crop growth and yield. Almost fifty percent of the irrigated land is affected by high salinity, often resulting in secondary Stalinisation due to inappropriate use of saline irrigation water. The African baobab (*Adansonia digitata* L.) is a gigantic, deciduous, stem-succulent iconic tree belonging to the family Malvaceae and subfamily Bombacoideae. The general objective of this research was to study the effect of salinity on growth and physiological behaviours of baobab seedlings related to classification them in terms of salt tolerance. Baobab seedlings from three contrasting Malian provenances seedlings (western, southern and eastern) have been collected related to different precipitation gradient and IWC-IWC-O of top soil from those provenances were selected to using and tested for their salinity tolerance. The effect of salinity on growth indicators of seedlings of three provenances was compared after revealing to increasing salt stress. The old seedlings were adapted 0–20-40 mM NaCl with final nutrient solution for ten weeks. Seedlings of baobab growth were slightly influenced by 20 mM NaCl but were noticeably reduced on 40 mM NaCl treatment. Salt stressed seedlings had a reduced characteristic appearance rate such as: length, diameter, number of leaves and, leaf area. Increased NaCl salinity decreased the chlorophyll fluorescence and relative chlorophyll content in 40 mM treatment compared with the control. Response of morphology baobab seedlings of eastern Mali was significantly higher resistant to salt stress compared to the northern and southern Mali provenance. Seedlings of the northern provenance in Mali seem to be least resistant to salt stress. However, resistance of salinity on physiological characteristics from this provenance is higher compared to other seedling of two provenances. In additional, the seedlings of the provenances for physiological behaviour showed compensation for an increased response in length, leaf area etc as means of recovery for morphology. Results indicate that salinity significantly influences growth and physiology behaviour of baobab seedlings. Therefore, the baobab seedlings appear to be very salt-sensitive species.

Keywords: Baobab, biomass allocation, growth, Mali, morphology, physiology, salinity

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