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Variation in Baobab (*Adansonia digitata* L.) Root Tuber Development and Leaf Number among Different Growth Conditions for Five Provenances in Malawi

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Abstract

The baobab tree is an indigenous fruit tree in sub-Saharan Africa and an underutilised resource which is at the same time vulnerable to overexploitation in areas close to centres of demand, as current utilisation of the tree depends on the presence of wild individuals. Baobab seedlings are known to form root tubers. However, little has been reported about the root tuber's growth characteristics and its yield potential as a vegetable which may aid conservation of baobab through its use. This study aimed to investigate the root tuber development of baobab seedlings grown from seeds of five provenances and at three different planting distances in two nursery trials at climatically distinct locations in Malawi, namely Mzuzu and Mangochi. The observed yield potentials were also used to conduct preliminary farm-gate profitability analyses for three different scenarios that differed by planting distance. Results indicated increased growth rates for root dry mass and number of developed leaves with increasing planting distance, but no effect of seedling provenance on any measured plant growth parameter. However, a large variability between individual plants was observed. Seedlings invested mainly into root development during the growth period, with root tubers reaching an average fresh weight of 41 g and an average length of 24 cm at 138 days after sowing. The profitability analyses yielded a maximum total net benefit per harvest cycle of 16 weeks of +12.78 USD per 100 m² of land cultivated with baobab root tubers, faring well against the chosen alternative of maize cropping on the same area and demonstrating the potential of baobab root tuber cultivation. However, the heterogeneity of root tuber development as affected by abiotic and biotic factors, as well as genetic origin warrant further investigations.

Keywords: Baobab, indigenous fruit tree, Malawi, root tubers, underutilised plants