Domestication of Baobab (*Adansonia digitata* L.) in Kenya: Selecting Elite Mother Trees by Using a Multi-trait Approach

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Abstract

Baobab (*Adansonia digitata* L.) with its highly nutritious fruit pulp is an important wild fruit tree in Kenya. The increasing demand for pulp from domestic and international markets puts pressure on wild baobab populations. Domestication and cultivation of baobab in agroforestry systems may result in better quality and higher quantities of baobab fruit pulp and simultaneously contribute to the conservation of this valuable plant resource. Within the Baofood project, this study aimed at developing a multi-trait approach for selecting elite baobab mother trees based on morphological characteristics and pulp chemical composition for future baobab domestication.

Two baobab populations were surveyed in Kenya and a total of 71 trees randomly selected. Ten fruits per tree were collected for assessing several quantitative and qualitative morphological traits. Pulp samples from each of the accessions were analysed for their soluble solids contents (° Brix) and total titratable acidity (TTA). Superior mother trees were identified by applying principal component analysis (PCA).

The studied 71 individual baobab trees were highly variable regarding morphological fruit characteristics. Mean fruit weight per accession ranged from 73–696 g with an overall median of 227 g. Total yield had a median of 54 kg per tree, ranging from 7 to 160 kg. Pulp weight also showed a high variability (median 38, range 11–136 g). Pulp proportion from the whole fruit ranged from 13 to 23 % with a median of 17 %. Median Brix was 11° (range 6–18°), while median TTA was 0.7 g equivalent malic acid/100 g fresh matter (range 0.4–1.2). A final PCA was performed using six traits with low levels of auto-correlations. Two elite mother trees were identified in each of the two research areas, with highest axis loadings for the traits 'yield' and 'Brix', while 'pulp proportion' was not considered as important by the PCA. After adding further fruit traits such as vitamin C content in future analyses, the finally selected trees should be used for vegetative propagation and tested on farms for their performance. Results of our study can contribute to better utilisation of baobab and to improved nutrition and livelihoods of rural communities in Kenya and beyond.

Keywords: Agroforestry, characterisation, conservation, fruit pulp, nutrient content

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