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Patterns of Genetic and Morphometric Diversity in Baobab (*Adansonia digitata*) Populations Across Different Climatic Zones of Benin (West Africa) FREE

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Abstract

- *Background and Aims* Baobab (*Adansonia digitata*) is a multi-purpose tree used daily by rural African communities. The present study aimed at investigating the level of morphometric and genetic variation and spatial genetic structure within and between threatened baobab populations from the three climatic zones of Benin.
- *Methods* A total of 137 individuals from six populations were analysed using morphometric data as well as molecular marker data generated using the AFLP technique.
- *Key Results* Five primer pairs resulted in a total of 217 scored bands with 78.34% of them being polymorphic. A two-level AMOVA of 137 individuals from six baobab populations revealed 82.37% of the total variation within populations and 17.63% among populations ($P < 0.001$). Analysis of population structure with allele-frequency based F -statistics revealed a global F_{ST} of 0.127 ± 0.072 ($P < 0.001$). The mean gene diversity within populations (H_S) and the average gene diversity between populations (D_{ST}) were estimated at 0.309 ± 0.000 and 0.045 ± 0.072 , respectively. Baobabs in the Sudanian and Sudan-Guinean zones of Benin were short and produced the highest yields of pulp, seeds and kernels, in contrast to the ones in the Guinean zone, which were tall and produced only a small number of fruits with a low pulp, seed and kernel productivity. A statistically significant correlation with the observed patterns of genetic diversity was observed for three morphological characteristics: height of the trees, number of branches and thickness of the capsules.

• **Conclusions** The results indicate some degree of physical isolation of the populations collected in the different climatic zones and suggest a substantial amount of genetic structuring between the analysed populations of baobab. Sampling options of the natural populations are suggested for *in* or *ex situ* conservation.

Keywords: [Adansonia digitata](#), [baobab](#), [population structure](#), [morphometric variation](#), [climatic zones](#)

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