One mainland African baobab species or two? Implications for productivity and sustainable use.

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Until now, only a single species of baobab was recognised across the African continent: Adansonia digitata. Recently, a second species of African baobab was described: A. kilima Pettigrew et al., which unlike the well known and widespread tetraploid A. digitata, is reported to be diploid. Differences in key traits (stomatal size and density, floral features) have been linked to the differences in ploidy of the two species. However, the study describing this new species was very limited in scope. We propose to test the validity of this new species in Africa by extensively sampling using material (leaf and floral where possible) from trees across its range, but with a particular focus on southern Africa. We will corroborate differences in floral traits, stomatal size and density with ploidy (using chromosome counts and flow cytometry) and test whether the newly identified diploid is a distinct species. Different ploidy levels may also provide the key to understanding the lack of productivity of certain trees (so called 'poor-producers' or 'male' trees that produce ~<5 fruits annually). Genome size reduction often affects morphological features of bioeconomic importance (viz. fruit). We plan to test the hypothesis that 'poor producers' are triploid due to hybridization between diploid and tetraploid trees. Collectively, these findings will have considerable bioeconomic impacts, given the cultural, economic and medical importance of the baobab trees. If a second baobab species is found, conservation planning must ensure sustainable harvesting of both species. Further, reduced abundance of diploids may highlight possible biodiversity losses due to global change. Our findings could potentially improve current and future cultivation, commercialization, and conservation of baobabs.