

Morphological and molecular systematics of the genus *Coffea* L. (Rubiaceae) in the eastern arc mountains and lowland eastern Tanzania forests

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Phylogenetic relationships of Tanzania *Coffea* species from different localities were inferred from the nucleotide sequences of three plastid loci (*trnL*, *rpL16*, *accD-psaI*), one nuclear locus (Internal Transcribed Spacer: ITS) and from a morphological data set. DNA was extracted from 0.05-0.3 g of silica gel-dried leaves and from herbarium specimens using modified cetyltrimethyl ammonium bromide (CTAB) procedures. The four loci were amplified by Polymerase Chain Reaction (PCR) and sequenced using ABI PRISM 3100 automated DNA sequencers. The sequences of *Coffea* species obtained from the four loci show slight length variation among and within taxa. Separate and combined parsimony analyses were carried out with the aim of gathering an insight into what information is carried by each data set. The results obtained from the combined analysis were much more informative compared to the separate analyses. In the combined analysis a number of groups of *Coffea* taxa were consistently obtained with some additional groups that were not present in the analyses of the separate data sets. Four main clades were revealed representing a strong biogeographical correspondence in respect to the Eastern Arc Mountains and the lowland coastal forests of Tanzania, although bootstrap support values were more or less low. Phylogenetic analysis using morphological characters alone revealed that morphological characters in *Coffea* species studied here contained poor phylogenetic signal, and a higher degree of homoplasy than molecular data, limiting their usefulness in phylogenetic reconstruction. Regardless of the overall low level of sequence variation observed, it was concluded that both morphological and molecular data sets allow us to better understand the phylogeny and biogeography of Tanzanian *Coffea* species. In addition, these results give us a good starting point for forwarding hypothesis on the relationships between all *Coffea* species. Based on morphological and molecular data, two of unnamed *Coffea* species from Tanzania were described. *Coffea* sp. nov. 1 of the Flora of Tropical East Africa (FTEA) was named *Coffea kihansiensis* while *Coffea* sp. B. was named *Coffea bridsoniae*.