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TITLE: *Bruguiera hainesii*, a critically endangered mangrove species, is a hybrid between *B. cylindrica* and *B. gymnorhiza* (Rhizophoraceae)

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ABSTRACT:

*Bruguiera hainesii* (Rhizophoraceae) is one of the two Critically Endangered mangrove species listed in the IUCN Red List of Threatened Species. Although the species is vulnerable to extinction, its genetic diversity and the evolutionary relationships with other *Bruguiera* species are not well understood. Also, intermediate morphological characters imply that the species might be of hybrid origin. To clarify the genetic relationship between *B. hainesii* and other *Bruguiera* species, we conducted molecular analyses including all six *Bruguiera* species using DNA sequences of two nuclear genes (*CesA* and *UNK*) and three chloroplast regions (intergenic spacer regions of *trnL-trnF*, *trnS-trnG* and *atpB-rbcL*). For nuclear DNA markers, all nine *B. hainesii* samples from five populations were heterozygous at both loci, with one allele was shared with *B. cylindrica*, and the other with *B. gymnorhiza*. For chloroplast DNA markers, the two haplotypes found in *B. hainesii* were shared only by *B. cylindrica*. These results suggested that *B. hainesii* is a hybrid between *B. cylindrica* as the maternal parent and *B. gymnorhiza* as the paternal one. Furthermore, chloroplast DNA haplotypes found in *B. hainesii* suggest that hybridization has occurred independently in regions where the distribution ranges of the parental species meet. As the IUCN Red List of Threatened Species currently excludes hybrids (except for apomictic plant hybrids), the conservation status of *B. hainesii* should be reconsidered.

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