

Molecular studies on dabai (*Canarium odontophyllum* Miq.): DNA profiling and sex typing using RAPD markers

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ABSTRACT

Dabai (*Canarium odontophyllum* Miq.) is locally known in Sarawak as Sibulivines. It is an important indigenous fruit species that has immediate potential for commercial exploitation. It has been domesticated in Sarawak and cultivated extensively in Sibulivines, Kapit, Sarikei and Limbang. In the present study, we examined 1). the genetic relatedness of dabai accessions collected from two different locations, namely Sarikei and Sibulivines in Sarawak using random amplified polymorphic DNA (RAPD) markers, and 2). the development of Sequence Characterized Amplified Region (SCAR) markers for sex typing in dabai. Five out of 52 RAPD primers screened, namely OPI12, OPL03, OPL14, OPZ07 and OPZ19 that yielded reproducible, informative and scorable fragments were chosen for DNA profiling of dabai accessions. A total of 81 reproducible RAPD loci were generated where 88.9% of the fragments were identified as polymorphic band with the size ranging from 300bp to 2kb. In general, the germplasm exhibited a high level of molecular diversity and DNA polymorphism. Molecular diversity based on Jaccard's similarity coefficients among 10 dabai accessions ranged from 0.29-0.70. An UPGMA dendrogram was constructed based on the Jaccard's coefficient of similarity matrix which then grouped the dabai accessions into two main clusters, Cluster 1 contained dabai accessions collected from Sarikei and Sibulivines, while Cluster II contained dabai accessions collected from Sarikei only. The results indicating that those dabai accessions share common alleles. This situation may be resulted from frequent movement of seeds or planting stocks across these localities. Apart from these, we also successfully identified 20 hermaphrodite-specific and 18 male-specific diagnostic bands of dabai by using Bulk Segregant Analysis (BSA) approach. These diagnostic bands then were re-amplified using 15 male and 23 hermaphrodite samples individually. To date, one unique hermaphrodite-specific diagnostic band (DH₂₅₀) amplified by one of the RAPD primers was detected in all hermaphrodite samples but absent in all male samples. This diagnostic band can be subsequently converted into SCAR marker. Once developed, this SCAR marker has great potential in facilitating dabai improvement and conservation programmes and thereby in advance, proposing an economic and yet profitable planting approach for dabai plantation.

Keywords: *Canarium odontophyllum*, RAPD, genetic relatedness, sex typing, Bulk Segregant Analysis (BSA), SCAR