

## DNA barcoding of endangered *Paphiopedilum* species (Orchidaceae) of Peninsular Malaysia

### ABSTRACT

In this study, the efficacy of four DNA markers and their combinations (*rbcL*, *matK*, *ITS*, *trnH-psbA*) as barcode markers were tested across the endangered *Paphiopedilum* species from Peninsular Malaysia. Four species of *Paphiopedilum* were sampled and barcoded. The DNA barcodes reliabilities were evaluated using NCBI BLASTn program, phylogenetic tree via Neighbour-Joining method with 1000 bootstrap replicates in MEGA 6 and barcoding gap assessment. *matK* is the most promising barcode with high sequence quality (100%), high accuracy in BLASTn (100%), clear resolution of species in Neighbour-Joining phylogenetic tree (100%) and a distinct barcoding gap followed by *ITS*, *trnH-psbA* and *rbcL*. The combination of barcode regions revealed the lack of variation in *rbcL* and *trnH-psbA* but they are still useful for preliminary identification followed up by *matK* for accurate identification.

**Keyword:** DNA barcodes; *Paphiopedilum*; Identification; Endangered species; Taxonomy; Monocots

