**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