

Development of species-specific SCAR markers for identification and authentication of three rare Peninsular Malaysian endemic *Coelogyne* (Orchidaceae) orchids

ABSTRACT

Background: *Coelogyne kaliana*, *Coelogyne stenochila* and *Coelogyne tiomanensis* are three valuable rare orchid species endemic to Peninsular Malaysia, currently rampantly traded illegally via the internet and through local nurseries, which label them as hybrids to avoid enforcement detection. Drastic measures to ensure the continued existence of their populations in the wild should be introduced as they are rapidly diminishing into extinction, including the development of rapid and accurate species-specific identification tools. These three orchid species are highly similar morphologically and currently it is impossible to distinguish among them without their reproductive structures. Methods: RAPD-based species-specific SCAR markers were developed to distinguish and authenticate the identity of these three endemic Peninsular Malaysian *Coelogyne* species. Results: Three SCAR markers were successfully developed in this study. SCAR marker primer pair, CKL_f / CKL_r was specific to *C. kaliana* as it produced a unique single band of 271 bp but not in *C. stenochila* and *C. tiomanensis*. SCAR marker primer pair CST_f / CST_r amplified a single band of 854 bp in *C. stenochila* and two bands of different sizes (372 bp and 858 bp) in *C. tiomanensis*, but no amplification in *C. kaliana*. The third SCAR marker primer pair, CTI_f / CTI_r produced a single band (about 500 bp) for both *C. stenochila* and *C. tiomanensis*, but showed no amplification in *C. kaliana*. Conclusions: Although not all these SCAR markers were species amplification specific, they could be used to discriminate among the three *Coelogyne* species effectively. Accurate species identification is one of the most important steps to allow a proper management plan to be established in the effort to conserve these three endangered orchid species of Peninsular Malaysia. Besides, it could effectively put a stop to the illegal trading of these rare endangered orchid species worldwide.

Keyword: *Coelogyne kaliana*; *Coelogyne stenochila*; *Coelogyne tiomanensis*; Endemic species; RAPD; SCAR; Species identification; Taxon delimitation