

Cloning and characterization of a 9-cis-epoxycarotenoid dioxygenase genes in developing seeds of a tropical terrestrial orchid, *Phaius tankervilleae*

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Orchid seeds are characterized by their tiny size, with a globular stage embryo and without endosperm. Seed germination in vitro of some terrestrial orchids is difficult as the seed matured. Previous studies have shown that the endogenous ABA level of seeds remained high at maturity, suggesting that the low germination percentage may be caused by the accumulation of high level of ABA in mature seeds. In developing seeds of *Phaius tankervilleae*, we cloned a gene, with predicted protein sharing high sequence similarity with the 9-cis-epoxycarotenoid dioxygenase (NCED) that was up-regulated as the seed approached maturity. Southern hybridization confirmed that this NCED, named as PtNCED1, is a single copy gene in *P. tankervilleae*. As NCED catalyze the conversion of 9-cis xanthophylls to xanthoxin, an ABA precursor, it is speculated that the un-descending NCED transcripts in seeds may cause the accumulation of endogenous ABA. Transient expression of PtNCED1 gene in tobacco leaves resulted in the accumulation of ABA as compared to the control.