

Monthathip Thongkum 2010: Characterization and Expression Study of *Ethylene Response Sensor 1 (Den-ERS1)* in *Dendrobium* spp. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Mrs. Parichart Burns, Ph.D. 109 pages.

Full length of *Ethylene Response Sensor1 (Den-ERS1)* was isolated from 2 *Dendrobium* cultivars; ‘Khao Sanan’ and ‘Pompadour’. The *Den-ERS1* from ‘Khao Sanan’ and ‘Pompadour’ cDNA sequences were 2,299 and 2,307 nucleotides in length which encode 621 and 622 amino acid, respectively. Genome organization of *Den-ERS1* consists of 3 exons (exon I, II and III) and 2 introns (intron I and II). The presence of *cis* acting elements within putative promoter region and introns was determined using bioinformatics approach including PLACE and PlantCARE. Core promoter, TATA and CAT box was found at position -57 and -74 from transcription start site. Important ethylene related elements including ethylene response elements (ERE; ATTCAAA) in 5’ flanking region and wound-responsive element (WUN; AAATTTCCCT) in intron II were found. Southern analysis indicated a single copy of *Den-ERS1* in ‘Khao Sanan’ and ‘Pompadour’. The presence of *Den-ERS1* transcript in orchid organs as well as during flower development and flower senescence both natural and induced was investigated using Northern analysis. *Den-ERS1* was found differentially expressed in every orchid organ. Within flower parts, *Den-ERS1* transcripts were found highly accumulated in lip and column. The transcripts were accumulated in young bud (B3) and decreased as flower development progressed and increased again at full bloom (OF4). During flower senescence, the expression was high at early senescent stages and decreased towards the end of senescence. Pollination and emasculation induced flower senescence in both ‘Khao Sanan’ and ‘Pompadour’ and reduction in *Den-ERS1* expression.

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