

**Title** Isolation and characterization of ethylene related genes during pollination induced senescence of *Dendrobium* orchids

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**Keyword** *Dendrobium*; ethylene related genes; pollination

### **Abstract**

Pollination hastens senescence in most flowers via the regulation of the ethylene pathway. This phenomenon impacts on the lucrative orchid cut flower industry when attractive hybrids that are ethylene-sensitive undergo rapid post-pollination induced senescence. Manipulation of ethylene-associated genes could overcome the problem in transgenic orchids if ethylene biosynthesis is suppressed or if the signal transduction pathway is confounded. While ACCO oxidase and ACC synthase have been acknowledged as key enzymes in the ethylene biosynthesis pathway, knowledge about ethylene receptors in orchids is still quite limited and often confusing. In our studies with *Dendrobium* Pompadour orchids, we have isolated three ethylene receptors first characterized in *Arabidopsis*, namely ETR1, ERS1 and EIN4. Physiological studies have shown that within 24 hours, pollinated *Dendrobium* flowers display an increase in ethylene production after pollination, alongside distinct visual changes. The presence of ETR1, ERS1 and EIN4 genes in pollinated and unpollinated flowers was detected using RT-PCR. Detailed analysis, with Scan Prosite, showed that the nucleotide sequence for the RT-PCR product shares sequence homology with the orchid, *Phalaenopsis* as well as tobacco, rice, petunia and carnation. Sequence results for ERS1 and EIN4 as analysed and characterized using bioinformatics tools will also be presented.