



University of Tsukuba

Plant Transgenic Design Initiative

48th PTraD Research Seminar

T-PIRC Research Seminar

Date and Time: 2019/9/3 (Thu) 13:30 –14:15

Place: Gene Research Center, Seminar Room (211)

Identification of Small RNAs and Target Genes in Ethylene Signal Transduction in *Oncidesa* ‘Gower Ramsey’

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Oncidesa is a popular orchid with high economic value in cut-flower markets around the world. Either exogenous and endogenous ethylene induces petal senescence of *Oncidesa*. The shelf-life of *Oncidesa* had been prolonged when ETHYLENE INSENSITIVE3 (EIN3), the key transcription factor in ethylene signal transduction, was knocked down by gene silencing. Transcriptome of *OgEIL1*-RNA interfering transgenic and non-transgenic plants were analyzed to understand the gene expression and regulation of mRNAs and small RNAs (sRNAs) and we tried to construct the *OgEIL1* regulatory network in *Oncidesa*. After high-throughput sequencing and de novo assembling, we got 587,771 transcripts in *Oncidesa* transcriptome. Among the sRNA sequences of *Oncidesa*, a total of 177 and 31 known miRNAs were annotated in leaf and flower, respectively. Eight and twenty putative novel miRNAs were identified in leaf and flower, respectively, after prediction by software. There are more differentially expressed transcripts and sRNAs between organs than those between transgenic and non-transgenic plants. According to gene ontology enrichment test of differentially expressed transcripts in *OgEIL1*-RNA interfering plant, many enriched GO terms were related to sulfur metabolic process. The gene expression levels of miR164 family which are negatively regulated by EIN3 were up-regulated in the *OgEIL1*-RNA interfering transgenic plant. The target transcripts of differentially expressed miRNAs were identified and some of them are transcription factors involving in ethylene response, such as AR2, bHLH, EIL, and NAC. These results indicate that EIN3 may not only directly regulate the expression of ethylene-related genes, but also control the miRNAs to manipulate the *Oncidesa* gene network delicately.

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