

**[P3] Abiotic Stress for Crop Production**

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

1:15 PM - 2:00 PM

**[P3-24] Transcriptional Regulation of the Stress-Inducible  
Photosynthesis in the Common Ice Plant, *Mesembryanthemum  
crystallinum* L.**

<sup>○</sup>Sakae Agarie<sup>1</sup>, Kento Kuroda<sup>2</sup>, Kasumi Nishikawa<sup>2</sup>, Nanako Isshiki<sup>2</sup>, Yoko Ide<sup>3</sup>, Kazuyuki Saito<sup>1</sup>, John C. Cushman<sup>4</sup> (1.Faculty of Agriculture, Kyushu University, Japan, 2.Faculty of Agriculture, Kagawa University, Japan, 3.Faculty of Agriculture, Saga University, Japan, 4.Department of Biochemistry and Molecular Biology, University of Nevada, Reno, United States)

Crassulacean acid metabolism (CAM) is a photosynthetic pathway that evolved from C<sub>3</sub> mode under the condition of limited water supply. The expressions of the genes related to the key metabolic process of CAM are regulated under circadian control. CAM species fixed CO<sub>2</sub> at night by phosphoenolpyruvate carboxylase (PEPC) and stored produced malic acid in the vacuole. PEPC is activated by phosphorylation mediated by PEPC kinase (PPCK). A facultative CAM plant, *Mesembryanthemum crystallinum*, shifts photosynthetic mode from C<sub>3</sub> to CAM under salinity and drought stresses. To elucidate the factors of transcriptional regulation in the transition of CO<sub>2</sub> fixation, we isolated the 5'-flanking regions of CAM-related genes for two isoforms of PEPC, PEPCK and NADP-ME, which were encoded by *Mcppc1*, *Mcppc2*, *McPpck*, and *Mod1*, respectively. The transient assay of the promoter regions of *McPpck* indicated that the region within 540 bp upstream from the start codon included cis-element controlling the expression of the gene. We analyzed the expression of 20 genes encoding transcriptional factors, which were homologs of drought-induced genes of *Talinum triangulare*. The expression of MYB96 increased at night, and MYB-core and AC-element that are binding sites of MYB 96 were found in the region, indicating that the transcriptional factor is associated with the induction of CAM in *Mesembryanthemum crystallinum*.