

[P4] Crop Genetics and Physiology

2021年9月9日(木) 12:15 ~ 14:00 Room 4 (Poster) (Crop Genetics and Physiology)

13:15 ~ 14:00

[P4-22]Comparative Analysis of Sugar Metabolism in Rice Leaves under Field and Controlled Environments

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Environmental factors such as irradiance and temperature fluctuate under field environments while those in conventional growth chamber (GC) are usually regulated as square-wave condition, which are constant during the day and the night, and abruptly transited at dawn and dusk. To clarify the differences in the sugar metabolism of rice leaves under fluctuating environments and GC condition, we compared sugar and starch content and diurnal transcriptome of rice leaves grown in field and GC condition, and simulated field condition by SmartGC, a high-performance growth chamber that can control light, temperature and relative humidity by 1-minute resolution. In the field, sucrose content in leaves rose gradually after dawn, reached plateau and started to fall before dusk. Starch content in leaves also increased gradually after dawn and reached plateau before dusk. Similar trends were observed in conditions simulating fluctuation of light by SmartGC, although the sucrose and starch content in leaves tended to be higher in the field. On the other hand, sucrose and starch content in GC condition rose earlier after dawn than in the field and did not fall until dawn. The difference in the expressions of genes related to sugar metabolism between conditions was mainly found before dusk, which is consistent with the difference in sugar status of leaves. Overall, these results indicate that the difference in sugar metabolism of rice leaves in field and GC condition mainly derive from diurnal change of irradiance and is remarkable around dawn and dusk.