

## [P4] Crop Genetics and Physiology

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

12:15 ~ 13:00

### [P4-39] Maintaining Higher Leaf Photosynthesis After Heading Stage Contributes to Higher Biomass Accumulation in Rice

\*Nominated for Presentation Awards

○Sotaro Honda<sup>1</sup>, Satoshi Ohkubo<sup>2</sup>, Nan Su San<sup>2</sup>, Anothai Nakkasame<sup>2</sup>, Kazuki Tomisawa<sup>2</sup>, Keisuke Katsura<sup>2</sup>, Taiichiro Ookawa<sup>2</sup>, Atsushi J. Nagano<sup>3</sup>, Shunsuke Adachi<sup>2,4</sup> (1.Graduate School of Agricultural and Life Sciences, the University of Tokyo, Japan, 2.Graduate School of Agriculture, Tokyo University of Agriculture and Technology, Japan, 3.Faculty of Agriculture, Ryukoku University, Japan, 4.College of Agriculture, Ibaraki University, Japan)

Leaf photosynthetic rate changes across the growing season as crop plants age. Most studies of leaf photosynthesis focus on a specific growth stage, leaving the question of which pattern of photosynthetic dynamics maximizes crop productivity unanswered. In this study, we obtained high-frequency data of photosynthesis from two elite rice cultivars and 76 inbred lines across the growing season and analyzed associations between leaf CO<sub>2</sub> assimilation rate (*A*) dynamics and crop growth rate (CGR). A brand-new device "MIC-100", which enables high-throughput gas exchange examination, was used for *A* measurements (Tanaka, Adachi et al. 2021). The *A* values decreased as plants aged but small increase was found at around heading stage with a genetic variation. The integrated *A* value from heading to harvest was positively associated with CGR, but that before heading was not. A curve-smoothing analysis of *A* after heading showed that accumulated *A* at >80% of its maximum (*A*<sub>80</sub>) was positively correlated with CGR in analyses of all lines mixed and of lines grouped by genetic background, while the maximum *A* was less strongly correlated with CGR. These results suggest that maintaining high *A* after heading, rather than having high maximum *A*, is a potential target for enhancing rice biomass accumulation. We propose that multiple examinations of *A* with the high-throughput gas exchange device will achieve the screening of high-yielding crops with high photosynthetic capacity.