# [P4] Crop Genetics and Physiology

Thu. Sep 9, 2021 12:15 PM - 2:00 PM  Room 4 (Poster) (Crop Genetics and Physiology)

1:15 PM - 2:00 PM

## [P4-06]Estimation of Canopy Transpiration Rate in Rice after Heading Stage by Extracting Leaf Temperature in Thermal Images

*Nominated for Presentation Awards

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To understand biomass production process in rice, long-term monitoring of canopy transpiration rate (E) is useful. E before heading stage can be estimated using thermal imaging techniques and heat balance model (Monteith 1973) modified by aerodynamic resistance under windless condition ($r_a$*, Kondo et al. 2018). However, this technique is not applicable after heading stage because panicle surface temperature is higher than leaf temperature in the daytime. In this study, we aimed to extract leaf temperature in thermal images after heading stage, and to estimate E based on extracted leaf temperature. In 2019, cultivar 'Koshihikari' and 'Takanari' was cultivated. On August 11th (86 days after transplanting), 201 thermal images and micro meteorological data was recorded. Canopy temperature was extracted for each pixel and separated based on the assumption that it was composed of two normal distributions. Lower mean value of the distributions was assumed to be the representative of leaf temperature. Estimated E based on this leaf temperature was significantly higher in Takanari than Koshihikari. However, in both cultivars, estimated E based on the current protocol seems to be overestimated compared with the previous study. The source of the error might be the shaded region of leaves or panicles, which is not assumed in the heat balance model. Optimization of protocols to take thermal images and/or algorithms to extract leaf temperature is needed for the accurate estimation of E after heading stage.