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RICE (ORYZA SATIVA) RESPONSE TO TEMPERATURE AT SIMILAR VAPOUR PRESSURE DEFICIT

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Rice is one of the most important crops that provide food for most of the poor in the world. Rice production is highly vulnerable to increase in growing temperature and one strategy to cope is to use adapted genotypes. This study aims to determine rice physiological and growth responses to temperature at similar vapour pressure deficit to understand mechanisms to select for genotypes or traits adapted to high temperature. Two experiments in the Climatron of NIAES, Tsukuba, Japan: 35˚C/22˚C day/night temperature and 70% RH as high temperature compared with 32˚C/22˚C and 68% RH as control, and 32˚C/22˚C and 70% RH as control compared with 28˚C/22˚C and 69% RH as low temperature. The experiments used Akihikari, IR64, N22 and Takanari. Maximum photosynthetic rate, stomatal conductance and transpiration significantly increased while intercellular CO 2 concentration remained similar in N22 after 30 days of high temperature treatment. This translated to higher biomass in N22 during the early growth. Stem sucrose content in N22 was also highest in both temperatures. In the low temperature experiment, transpiration, intercellular CO 2 concentration and stomatal conductance in all the genotypes increased in the 32˚C/22˚C compared to those in the 28˚C/22˚C. However, there was no difference in the photosynthetic rate and total biomass between the temperatures. Total biomass followed similar trend as the leaf biomass. Takanari had higher total biomass in both temperatures. Stem sucrose content in Akihikari was higher in both temperatures.