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Genotypic difference in grain filling response to air temperature during reproductive stage of rice

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This study was performed to evaluate the varietal differences of grain filling response to air temperature during reproductive stage in rice. The pot experiments were conducted at the experimental farm of Seoul National University, Suwon, Korea in 2011 and 2012. Six rice varieties differing in maturity group (early maturing, medium-maturing, and mid-late maturing) were transplanted with 15 days old seedlings and grown under ambient air temperature condition before transferred to the temperature-controlled plastic houses. For the synchronization of growth stage, 15 rice seedlings (2011) and 10 rice seedlings (2012) per pot were transplanted in a circle and only main stems were grown by removing tillers at early stage of their emergence. At the initial heading stage, pots for each variety were transferred to the four plastic houses that were controlled to ambient temperature (AT), AT+1.5°C, +3.0°C and +5.0°C, respectively. Grain filling duration and maximum grain weight were estimated by fitting the time course change of grain weight to a logistic function. Grain-filling duration was not statistically different among temperature treatments in all the tested varieties, while maximum grain weight was decreased with the rise of air temperature above ambient during grain filling stage. The grain weight decrease in response to air temperature was different among varieties, being most sensitive in mid-late maturing varieties and least sensitive in early maturing varieties. These results imply that the decreased grain-filling duration would not be major factor to decrease the grain weight under higher temperature than the current AT while it would be attributed to physiological factors such as decreased photosynthesis and increased respiration.

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Biography

Kyu-Jong Lee received PhD in agronomy from Seoul National University. He is the senior researcher of research institute for agriculture and life science in Seoul National University.

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