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Flowering stability of different rice (*Oryza sativa* L.) varieties under the variation of natural atmospheric temperature with the gradient of daytime solar radiation

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Abstract

Rice is the main staple food crop in Sri Lanka contributing to more than 40 % of the daily calorie requirement. There is a wide variation in flowering among the rice varieties that originated in Asia which are distributed in a range of agro-ecological zones in the region. There is a genetic multiplicity among accessions as they display a wide variation in morphology and flowering. Climatic changes are mainly occurred due to concentrating the atmospheric pollutants which straightly influence the increase of global temperature. The increasing global atmospheric temperature is critically affecting to agricultural crop yield losses due to infertility. Obtaining rice varietal screening and identifications of early flowering ability is very important to breed the varieties escaping heat stress under the local environmental conditions. Therefore, this experiment was conducted to prescreen the flowering ability of the rice varieties under the local conditions. The experiment was laid out in randomized complete block design (RCBD), with five rice varieties including the Bg 11 802, Bg 358, Bg 374, IR64EMF and EMF with three replicates. The experiment was carried out under the DOA recommended fertilizer level (N - 105 kg/ha-1, P2O5 - 25 kg/ha-1 and K2O - 35 kg/ha-1). During the experimental period time taken to flowering, plant growth and grain yield were recorded. Analysis of variance was performed using STAR for Windows version 2.0.1 and means were separated using LSD. The rice variety EMF was prone early morning flowering ability (average time to flower opening at 7.20 AM and average time to flower closing at 10.15 PM) comparatively to Bg 11 802 (9.55 AM to 1.00 PM), Bg 358 (10.05 AM to 1.10 PM), Bg 374 (10.02 AM to 12.25 PM) and IR64EMF (9.30 AM to 11.15 PM) and variety EMF shows the early flower heading ability (69 days) comparatively to Bg 11 802 (77 days), Bg 358 (75 days), Bg 374 (76 days) and IR64EMF (71 days). Genes of rice variety EMF is responsible for the early flowering ability which important to escape the heat stress caused by atmospheric temperature therefore these genes can be incorporated to the future rice breeding.

Keywords: Flowering, Growth, Rice, Temperature, Yield

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