

# EFFECT OF THERMAL VARIATION ASSOCIATED WITH LATE PLANTING AND MILD WATER STRESS AT FLOWERING ON GROWTH AND YIELD OF RICE

T.H.S. Samarasena<sup>1</sup>, L.C. Silva<sup>2</sup>, D.M.D. Dissanayake<sup>1</sup>,  
Y.M.S.H.I.U. De. Silva<sup>2</sup> and H.R.M.C. Rathnayake<sup>2</sup>

<sup>1</sup> *Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka*

<sup>2</sup> *Rice Research and Development Institute, Bathalagoda, Sri Lanka*

Rice yield is affected by high temperature and drought stress. A field experiment was conducted to determine the impact of thermal variations on biomass partitioning, yield, yield component (YC) and further, to assess the spikelet opening time on yield under two different planting times and mild water stress at Rice Research and Development Institute, Bathalagoda, Sri Lanka. Experiment was laid out using a split-plot as four replicates. Main-plot factor was management condition whereas early planting flooded (NS), late planting flooded (HS) and late planting water stress (DS) about 14.2% Volumetric Moisture Content (VMC) of soil and sub-plot factor was rice varieties i.e., IR64, IR64-EMF and Bg358. Leaves, stem and sheath dry weight, yield (YC), Pollen Fertility Index (PFI), time of flower opening (FO), peak anthesis (PA) and end of flowering (EF), soil moisture content of DS and climatic data were recorded. Bg358 increased stem and sheath weight significantly, while leaf weight decreased under DS compared to NS. IR64-EMF showed significantly low Growing Degree Days (GDD) for FO and high PFI than other varieties across the main-plot factor. Variety Bg358 resulted high filled grain percentage (FGP) in DS, while the lowest was observed in NS. IR64-EMF recorded higher FGP compared to IR64 in HS and DS. The highest yield was obtained in Bg358 irrespective of main-plot factor, IR64-EMF recorded significantly slight yield increment compared to IR64 under HS and DS. Yield was significantly correlated with panicle/m<sup>2</sup>, grains per panicle, total biomass, GDD for FO, PA and EF and time of FO with *r* of 0.55, 0.80, 0.76, 0.90, 0.79, 0.80 and 0.63, respectively. Stepwise regression showed a relationship between yield and GDD for FO (79.6%). In conclusion, up to 14.2% soil moisture, Bg 358 positively responded to moisture depletion. Thermal variation and time of spikelet opening are the key determinants of yield, yield related traits of rice under late planting flooded and late planting water stress.

**Keywords:** Rice, Thermal variation, Time of planting, Water stress, Yield & Yield component