

EFFECT OF PLANT AND SPIKELET MORPHOLOGY ON CANOPY TEMPERATURE, POLLEN STERILITY AND GRAIN DEVELOPMENT OF RICE (*Oryza sativa* L.)

A.M.H.D.Amarapathi¹, L.C. Silva², D.M.D. Dissanayake¹, W.M.W.Weerakon² and P. Mahindapala²

¹*Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka*

²*Field Crop Research and Development Institute, Mahalluppallama, Sri Lanka*

The effect of morphology of four rice varieties on dynamics of canopy temperature, pollen fertility, spikelet sterility and yield were evaluated under field conditions at Fieldcrop Research and Development Institute, Mahalluppallama, Sri Lanka. Experiment was arranged in a two factor factorial in Randomized Complete Block Design. Factor 01 was two sowing times, early and late. Factor 02 was four rice varieties, Bg3171, Bg366, Bg358 and Bw1198. Daily maximum air temperature and relative humidity throughout cropping period, above canopy and within canopy temperature during anthesis, pollen fertility (PF) at heading, spikelet fertility (SF) at 14 days after anthesis, filled grain percentage (FGP), grain yield and morphological characters were recorded. Results of air temperature and spikelet surface temperature during anthesis were higher in late sowing than early sowing treatment. Interaction between sowing time and variety was significant for PF and grain yield, whereas interaction was not significant for FGP and SF. Pollen fertility and SF of Bg366 and Bg3171 were not affected by high air temperature, because they showed low canopy temperature than other varieties. In contrast, PF of Bg358 and Bw1198 in the late sowing reduced significantly ($p < 0.05$) by 24.6% and 39% respectively, compared to early sowing due to variation of canopy and spikelet temperature of varieties. Although Bg3171 performed better in early sowing, Bg366 performed better in late sowing, in terms of yield and FGP, compared to other varieties. Tiller angle, number of tillers, flag leaf angle, flag leaf: panicle ratio and percentage of covering of panicle by flag leaf were negatively correlated with PF, while flag leaf length was positively correlated with PF. It is suggested that, canopy temperature, PF and SF depend on the morphology of canopy. Further, Bg366 was the most adaptable variety for increasing air temperature in meeting any future climate change.

Keywords: High temperature, Pollen fertility, Rice, Spikelet sterility