

The Effect of Canopy Thermal Changes on Growth, Yield and Grain Sterility of Three Ultra-short age Rice Varieties under Aerobic and Flooded Conditions

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Canopy Temperature (CT) represents the temperature experienced by the uppermost portion of the crop canopy. CT may better explain the grain sterility associated with high temperatures than the air temperature. Most of the CT related experiments were conducted on wheat. Therefore, Sri Lankan rice varieties were evaluated at the Rice Research and Development Institute, Bathalagoda under two soil moisture conditions to realize the canopy thermal changes and its impact on growth, yield, and grain sterility. This Experiment was arranged in a two-factor factorial in Completely Randomized Design with eight replicates. Factor one was soil moisture conditions, aerobic, and flooded. Factor two was rice varieties; Bg 250, Bg 252, and Ld 253. CT, growth, and yield parameters were recorded. CT at 10:00 h had a positive impact ($r=0.76$) on grain yield in flooded condition and CT at 9:00 h had a positive impact ($r=0.77$) on yield in aerobic conditions. Grain sterility increased with increasing CT in both moisture conditions. The number of tillers was negatively correlated with maximum CT, while plant height was positively correlated with minimum CT in both conditions. CT at spikelets opening had a negative impact ($r=0.76, 0.80$) on pollen fertility at heading and positive impact ($r=0.95, 0.85$) on grain sterility in both conditions. Moreover, growth and yield performances were superior under flooded conditions compared to aerobic conditions. Interaction between soil moisture and variety was significant for thousand-grain weight and pollen fertility % where highest values were recorded by Bg 250 (29.33 g) and Bg 252 (96.4%) in flooded conditions, respectively. In conclusion, monitoring CT dynamics can be considered as a useful tool to assess the growth and yield performances of rice under varying environmental conditions.

Keywords: Rice (*Oryza sativa*), Canopy temperature, Aerobic & flooded conditions, Grain sterility, Pollen fertility