



Influence of environmental factors on spikelet opening in Bg 251 rice variety of Sri Lanka

S.V.A.S. Kumari ^{1,*} and L.C. Silva ²

¹ Department of Bio-science, University of Vavuniya, Sri Lanka.

² Rice Research and Development Institute, Batalagoda, Sri Lanka.

* Corresponding author email: ashinisaumya14@gmail.com

Abstract: Spikelet sterility is the most sensitive yield component when a rice crop is subjected to environmental stresses. The objective of the study was to understand the influence of time of incidence of sunrise, soil moisture, and a cumulative light interception on the ability of initiation signaling of spikelet opening, possible drought avoidance mechanisms on flower opening of ultra-short age rice variety, Bg 251. A pot experiment was conducted during the 2022 Yala season (April to July) at Rice Research and Development Institute, Batalagoda, Sri Lanka. A randomized complete block design was set up with four treatments of C (control; T1), A (aerobic; T2), FC (flag leaf cover; T3), and LC (leaf cover; T4) in four replicates. Spikelet opening time and duration were recorded at 10-minute intervals using a digital camera. Although mean air temperature, mean wind velocity, and sunshine hours had no significant effect on spikelet opening, mean relative humidity positively influenced spikelet opening time and duration. In T2, the highest canopy temperature (CT) was recorded as 33.5 °C, while spikelet opening time was observed to be advanced by 33 minutes. There was a significant difference ($p < 0.05$) in treatments on yield (YLD), number of panicles, number of filled grains of the main panicle, and its percentage. The principal component analysis explained 100% variance in three principal components. Starting time ($r = -0.953$), peak time ($r = -0.972$) and end time ($r = -0.863$) of spikelet opening showed a strong negative correlation with CT while leaf chlorophyll content indicated a positive correlation with starting time ($r = +0.515$) and peak time ($r = +0.505$) of spikelet opening. It was concluded that water stress advances the flower opening time in Bg 251. Spikelets require cumulative light interception for flower opening; therefore, it is the heat and drought tolerance mechanism of Bg 251.

Keywords: Canopy temperature, Cumulative light interception, Incidence of sunrise, Spikelet opening time, Ultra-short age rice variety