SCREENING OF RICE VARIETIES FOR HEAT TOLERANCE BASED ON THEIR AGRONOMIC AND PHYSIOLOGICAL TRAITS

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by

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ABSTRACT

Rice is the staple food of Sri Lankans. However, the rice production in Sri Lanka is threatened by the increasing air temperature. A continuous warming has occurred since 1930s in major agro ecological zones in Sri Lanka. Use of heat-tolerant rice varieties is an effective way to sustain the rice production in the future. Nineteen rice varieties including both newly improved and traditional varieties were screened inside a thermo-gradient chamber to identify rice varieties with high temperature tolerance based on their agronomic and physiological traits. Three temperature treatments (30 – 34 °C, 35 – 37 °C and 38 – 42 °C, mean temperatures from 10:00 am to 1:00 pm) were given during the flowering period using the naturally fluctuating thermo gradient inside the chamber. The yield per hill, filled grain percentage, average thermal stability and the chlorophyll content of the rice varieties were recorded. Bg 304 had high filled grain percentage (80.2% – 95.4%) and yield per hill (7.0 g – 9.7 g) in all treatments and selected as the best performed variety. Bg 305 also had higher filled grain percentage (76.4%) and yield per hill (11.4 g) at temperatures of 35 – 37 °C. Bg 94-1, Bg 352 and Bg 370 recorded poor performances for all traits evaluated and found to be very susceptible to high temperature. Bg 359, Suwadal, Pachchaperumal and Pokkali started flowering before 7:30 am while Bg 357, Bg 358, Bg 360, Bg 369 and Kalu heenati flowered during 7:30 – 10:30 am. These varieties should be further screened in target environments before used. Selected varieties can also be used in developing heat-tolerant rice varieties for future cultivation.

Keywords: Filled grain percentage, Flowering period, Heat stress, Yield