

RE-ASSESSING GRAIN FILLING CAPACITY AND THE YIELD POTENTIAL OF IMPROVED RICE VARIETIES

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Rice production in Sri Lanka is currently facing a major challenge due to a decade of yield stagnation. Despite the introduction of new varieties with improved yield capabilities, the rising demand for rice needs to be harnessed to current varieties for increasing the yield and productivity of the crop. This research was aimed at assessing the yield potential and grain filling capacity and exploring the relationships between morphology and grain filling capacity. A field experiment was carried out on a split-plot design in RRDI, Bathalagoda, during the Maha season, 2020/2021. Three groups based on maturity age, *i.e.*, 2 ½-3, 3½, 4-4½ months were the main plot, and varieties were the sub-plot factor, which were established separately using three replicates. Quantitative data on flag leaf area, culm thickness, number of tillers, unproductive tillers, days to physiological maturity, panicle length, grains per panicle and proportionate grain filling capacity were assessed. The mean yield and the grain filling capacities of 3 ½ maturity age were the highest (18.02 ± 0.90 g plant⁻¹ and $83.88 \pm 0.90\%$) ($p < 0.05$). Bw 367 (24.89 ± 0.90 g plant⁻¹) and Ld 365 ($95.62 \pm 2.58\%$) were the best performing varieties respective to the yield and the grain filling capacity. The 3 ½ month varieties were superior to the rest in culm, leaf and yield related traits. Grain filling capacity showed a robust and positively significant ($p < 0.05$) relationship between the yield and the grain filling capacity of the upper and lower portions of the panicle. The superior varieties were At 307, At 308 in the 2½-3-months age group, Bg 94-2, Bw 367 in the 3½-months age group and Bg 400, Bg 455 in the 4-4½-months age group. The potential yield can be increased by improving grain filling capacity and the superior grain filling capacity in both the upper and the lower portions. Varieties screened as superior can be further recommended to farmers targeting higher yield and enhanced productivity.

Keywords: Culm thickness, Grain filling, Maturity age, Productivity