

EFFECT OF BIOFILM BIOFERTILIZERS ON THE WATER USE EFFICIENCY OF LOWLAND RICE (*Oryza sativa* L.)

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High water consumption in rice (*Oryza sativa* L.) cultivation challenges sustainable agriculture, particularly in the face of climate change. Biofilm biofertilizer (BFBF) has been reported to improve soil organic matter and offers the potential to improve water conservation in agroecosystems. This study aimed to investigate the impact of BFBF on the water usage of rice by conducting a pot experiment using two varieties: wetland (At 314) and upland (Bg 251). Two fertilizer practices were tested: (a) chemical fertilizer (CF) at 340 kg NPK ha⁻¹, recommended by the Department of Agriculture, Sri Lanka, and (b) BFBF at 225 kg NPK ha⁻¹ + 2.5 L BFBF ha⁻¹. Three water regimes were applied: (a) flooded, (b) field capacity, and (c) 65% field capacity, using three-factor factorial completely randomized design with three replicates. The amounts of water required to maintain the water regimes were recorded daily. Total water usage, net assimilation rate (NAR), relative growth rate (RGR), and 100-grain weight were measured. Data were analysed using a factorial ANOVA followed by Tukey's HSD test. The results highlighted that water usage in the wetland variety was significantly ($p < 0.05$) reduced by 8-12% with the application of BFBF, while water usage remained comparable between both fertilizer practices in the upland variety. Both varieties showed comparable NAR and RGR across fertilizer practices. The 100-grain weight decreased with increasing water stress in all varieties and fertilizer practices. Results suggest that water usage was comparable in both CF and BFBF practices in upland rice. In wetland rice, BFBF application significantly reduced water usage without affecting grain yield, indicating a promising strategy for efficient water management in agriculture. Further research under field conditions with larger plot sizes is recommended to confirm these results

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