The Impact of Replacing Inorganic Fertilizer with Bio-fertilizer on Growth and Yield Performance of Bg 250 Rice (*Oryza sativa* L.) Cultivar

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Inorganic fertilizers are used to enhance soils and plants with essential nutrients. However, they are not environmentally friendly. They cause water and air pollution and produce health hazards. In addition, they may destroy the fertility of the soil. Bio-fertilizers are applied to the cropping fields as a supplement to inorganic fertilizers. Considering this, an experiment was conducted in the 'Yala' 2017 at the Rice Research Station, Sammanthurai, Sri Lanka to assess the impact of bio-fertilizers on the growth and yield of rice cultivar 'Bg 250'. This experiment was laid out in the Randomized Complete Block Design with five treatments and four replications. The treatments were T1 – No fertilizer added, T2 – 100 % only inorganic fertilizer added, T3 – 50 % inorganic and 50% bio-fertilizers added, T4 – 50 % bio-fertilizer was added and T5 – 100% bio-fertilizer added. Rice cultivar 'Bg 250' seeds were water soaked and the sprouted seeds were planted on a seedling tray. Twelve days old seedlings were transplanted in soil filled plastic pots. Microorganisms extracted from the root wash of Guinea grass (*Panicum maximum*) consisted of *Azotobacter chrocooccum*, *Azospirillum brasilense*, *Bacillus polymyxa*, *Bacillus megaterium* and other *Bacillus* spp. was used as the bio-fertilizer. It was prepared by mixing with cow dung, cow urine and water. Incubated bio-fertilizer was applied during the late evening. The collected data were statistically analyzed and the difference between treatment means was compared using DMRT. It was found that there were significant (p <0.05) differences between treatments in the tested growth attributes and yield components. Treatment with the mixture of 50 % inorganic and 50 % bio-fertilizers has recorded the highest plant height (58.2 cm), panicle length (21 cm) and plant dry weight (200 g plant-1). Addition of 100 % bio-fertilizer has produced the highest 1000 grain weight (25.2 g). The lowest values were obtained in the no fertilizer treatment. Hence, the application of inorganic and bio-fertilizers in combination has produced the highest growth and yield attributes than the other treatments. It is therefore concluded that, bio-fertilizer could be used as a supplement to inorganic fertilizer to improve the growth performance and yield of 'Bg 250' rice cultivar. Moreover, bio-fertilizers are eco-friendly and provide no hazardous effects to human health.

Key words: Bg 250, Bio-fertilizer, Panicle length, Plant dry weight, Rice