

## Effects of Chemical and Biofertilizers on Yield, Chlorophyll and Selected Growth

### Attributes of Bg 250 Rice (*Oryza sativa* L.) variety

L. M. Rifnas<sup>1\*</sup>, S. Mahendran<sup>1</sup> and Y. B. Iqbal<sup>2</sup>

<sup>1</sup>Department of Agricultural Biology, Faculty of Agriculture, Eastern University, Sri Lanka

<sup>2</sup>Rice Research Station, Department of Agriculture, Sammanthurai, Sri Lanka

\*Corresponding author: rifnaslm@yahoo.com

Excessive and improper usage of chemical fertilizers on rice cultivation leads to adverse effects on human and environment. It is necessary to find a suitable alternatives for chemical fertilizer. Bio-fertilizer containing beneficial microorganisms is used as an alternative, to replace or reduce the chemical fertilizer usage. An experiment was conducted at the Rice Research Station, Department of Agriculture, Sammanthurai, Sri Lanka, during the 'Yala' season 2017 to assess the growth performance of rice variety Bg 250 with chemical and bio-fertilizer. The experiment was laid out in Randomized Complete Block Design with five treatments and four replications. The treatments were T<sub>1</sub>-No fertilizer (Control), T<sub>2</sub>- 100% recommended dose of chemical fertilizer (Urea 225 kg/ha, TSP 55 kg/ha and MOP 60 kg/ha), T<sub>3</sub>-50% chemical fertilizer + 50% biofertilizer (250 ml/ha), T<sub>4</sub>-50% biofertilizer, T<sub>5</sub>-100% biofertilizer (500ml/ha). The microorganisms isolated from the root wash of 'Gini Grass' (*Panicum maximum*) (Gro Bio-fertilizer<sup>®</sup>) consisted of *Azotobacter chroococcum*, *Azospirillum brasilense*, *Bacillus polymyxa*, *Bacillus megaterium* and other *Bacillus* spp. in liquid base medium used as the bio-fertilizer. It was mixed at the rate of 500 ml/ha with cow dung (10 kg), cow urine (5 L) and water (10 L) and kept for three days under shade. Incubated biofertilizer was applied by directly pouring into the treated pots. Rice cultivar Bg 250 was evaluated for selected growth attributes such as plant dry weight, chlorophylls 'a' and 'b' contents of leaves at vegetative stage, flag leaf length and rice yield. It was found that there were significant ( $p < 0.05$ ) different between the treatments in the tested parameters. Combined application of chemical (50%) and biofertilizer (50%) showed the highest plant dry weight (3.3g), chlorophylls 'a' (1.7mg/g) and 'b' (1.4mg/g), flag leaf length (80.1cm) and yield (2.5 tonnes/ha). The application of 100% chemical fertilizer showed 2.8g, 1.6 mg/g, 1.1 mg/g, 78.2cm and 2.0 tonnes/ha in plant dry weight,



chlorophylls a, b contents, flag leaf length and grain yield respectively. There were significant ( $p < 0.05$ ) difference in the grain yield of the 50% chemical and biofertilizers and 100% chemical fertilizer. Based on the results it was found that the combined application of 50% chemical and 50% biofertilizer showed the highest growth and yield in Bg 250 rice cultivar. Hence, it could be stated that 250 ml/ha biofertilizer used in the experiment, in combination with 50% chemical fertilizer could be an alternative means in the production of rice cultivar Bg 250 in the sandy loam soils of Ampara district.

**Keywords:** Biofertilizer, chlorophyll content, flag leaf length, plant dry weight, yield