

**THE IMPACT OF SOME BACTERIAL AND FUNGAL BIO-FERTILIZERS
ON THE ROOT ENDOPHYTIC FUNGAL POPULATION AND GROWTH OF RICE
(*Oryza sativa* L.)**

P.G.N.N. Premathilaka* and P.N. Yapa

*Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka,
Mihintale, Sri Lanka.*

**nipunipremathilake97@gmail.com*

Rice (*Oryza sativa* L.) is the most crucial staple food crop in Asia. However, extensive use of chemical fertilizers has led to the collapse of sustainability in rice cultivation, a decline in soil microorganisms, and significant challenges in food safety. Therefore, this study was carried out to investigate the effects of the nitrogen-fixing *Azospirillum* spp. and phosphorus-solubilizing bacteria, *Pseudomonas* spp., *Bacillus* spp. as well as *Trichoderma* spp. based biofertilizer application, on the endophytic fungal population and growth of rice. A pot experiment was conducted to assess the effects of biofertilizers on endophytic fungal population, and the growth and yield of rice. The fungal endophytes isolated from the six treatments (T1- Normal soil, T2- With Nitrogen fixing *Azospirillum* spp., T3- With Phosphorus solubilizing *Pseudomonas* spp., *Bacillus* spp. + Rock phosphate, T4- *Trichoderma* spp., T5- With *Azospirillum* spp. + *Pseudomonas* spp., *Bacillus* spp. + *Trichoderma* spp. + Rock phosphate, T6- With recommended inorganic fertilizer) belonged to common genera found in soil, including *Aspergillus flavus*, *Aspergillus niger*, two other *Aspergillus* spp., *Penicillium* spp., *Fusarium* spp., *Trichoderma* spp., and *Bipolaris* spp. The discovery of numerous potential plant pathogenic genera as endophytes supports the idea that they can be considered as latent pathogens. The statistical analysis revealed no significant difference in the diversity and abundance of root endophytes among the treatments ($p > 0.05$). Nevertheless, the control and the treatments showed significant differences ($p < 0.05$) in biometric parameters such as shoot length, root length, number of tillers per plant, flag leaf length, dry biomass, 100 grain weight, number of grains per panicle and harvest index. All the data were statistically analyzed using one-way ANOVA and the Tukey pairwise comparison test. Also, there were significant differences in soil nitrogen and phosphorus levels, soil pH and conductivity among the treatments. Although the biofertilizers used did not alter the rice root endophytes, it significantly increased the growth and yield of rice plants similar to the inorganic fertilizer added treatment. Therefore, the development and effective use of such biofertilizers could be considered a sustainable alternative for reducing the demand of synthetic chemical fertilizers in rice cultivation in Sri Lanka.

Keywords: *Sustainability, Endophytes, Growth & yield parameters, Rice*