

## Evaluating a Consortium of Rhizospheric Actinomycetes for Plant Growth Promotion Ability in Rice

H.D.D. Perera<sup>1</sup>, D.M. De Costa<sup>1\*</sup>, K.A.N.C. Perera<sup>1</sup>, W.S. Dandeniya<sup>2</sup>

<sup>1</sup>*Department of Agricultural Biology,*

<sup>2</sup>*Department of Soil Science, Faculty of Agriculture, University of Peradeniya, 20400, Sri Lanka*

\* *dmdcosta@agri.pdn.ac.lk*

Actinomycetes possess mechanisms to promote growth and mitigate biotic and abiotic stresses of plants. The present study evaluated a consortium of actinomycetes for its growth promotion ability in rice aiming to minimize the inorganic fertilizer usage in paddy cultivation. Ten rhizospheric actinomycete isolates, confirmed for their nitrogen fixing and phosphate solubilizing ability *in vitro* were tested on rice (var. Bg 360). The treatments were: no Nitrogen (N) and Phosphorus (P) fertilizer in inorganic or alternative form (T1), N and P inorganic fertilizer as recommended by the Department of Agriculture (DoA) (T2), 50% reduction of DoA recommended N and P fertilizer with the actinomycete consortium (T3) and only the actinomycete consortium (T4). Every treatment received the DoA recommended potassium dosage. A pot experiment was conducted using 5 L capacity pots having ten replicates/treatment according to a complete randomized design. Number of tillers/hill, % chlorotic leaves/hill, % heading-initiated tillers were recorded and root length, volume, and dry weight were measured. Incidence of sheath rot, the only disease observed was quantified. The % heading-initiated tillers, % chlorotic leaves, root volume and root dry weight were significantly differed among the treatments ( $p < 0.05$ ). T1 plants showed the highest % of chlorotic leaves but that percentage was significantly lower in the rest of the treatments. Root volume and root dry weight reported by the T3 plants were on par with those received the N and P inorganic fertilizer at DoA recommendation (T2). T3-treated plants reported a significantly higher % of heading-initiated tillers and a significantly lower sheath rot incidence, compared to the other treatments. The consortium introduced in the present study has the potential to reduce the recommended rates of inorganic N and P fertilizer by 50% without significantly affecting the tested parameters and reducing sheath rot incidence.

**Keywords:** N fixers, P solubilizers, Sheath rot, Leaf chlorosis