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Inoculation effect of an endophytic bacterium isolated from a legume weed on vegetative growth of Sri Lankan traditional rice variety 'Rata wee'

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Synthetic nitrogen (N) fertilizer is an important cost component of rice production in Sri Lanka, as nitrogen is a major limiting factor for rice. The use of endophytic nitrogen fixing bacteria is an innovative cost effective way for N management in rice. An endophytic bacterium was isolated from a local legume weed and the effect of this endophytic bacterium on vegetative growth performance of a Sri Lankan traditional rice Rata wee, was tested. Above bacterium was inoculated to rice through roots at seedlings stage under laboratory conditions. Six replicate plants were grown in pots with four treatments [Inoculated and fertilized (I/F), inoculated and non-fertilized (I/NF), non-inoculated and fertilized (NI/F) non-inoculated and non-fertilized (NI/NF)] under greenhouse conditions in a Complete Randomized Block Design (CRD). N fertilized plants were treated at an equivalent concentration of 50 kg ha^{-1}. Phosphorous and potassium were provided to all treatments according to the recommendation of the Department of Agriculture. Plant height (PH) was measured and number of tillers (NT) were counted to check the effects of inoculation on possible in planta nitrogen fixation. PH and NT were measured at 4^{th} and 8^{th} week of planting. The first expanded leaf was used in all tillers for total chlorophyll content (TC) at 4^{th} week. Significant positive effect ($P < 0.05$) of inoculation was recorded for TC, PH and NT. The highest TC (1.597 mg g^{-1}) was recorded in I/F treatment and the lowest (1.0486 mg g^{-1}) in NI/NF treatment. I/NF and NI/F treatments were not significantly ($P < 0.05$) different for TC. A significant effect of inoculation on PH was not observed as both I/F and NI/F plants gave similar values (98 and 100.3 cm respectively). However, in I/NF (81.7 cm), PH was similar to both fertilized and non-fertilized treatments. Significant highest NT values were observed for I/F,I/NF and NI/F (2.5, 1.3 and 1.7 respectively). These results indicate that legume weed isolate has the ability to improve vegetative growth in traditional rice and the potential to reduce N fertilizer requirement in rice cultivation. Future experiments under field condition would be required to determine the potential of local bacterial isolate in reducing the supplementary N fertilizer requirement for Sri Lankan rice through inoculation.

Keywords: Entophytic bacterium, inoculation, rata wee

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