

Performance of Plant Growth Promoting Rhizobacteria on Cluster Onion (*Allium cepa* L.) Under Field Condition

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A field experiment was conducted to evaluate the performance of previously screened plant growth promoting rhizobacteria on growth and yield of cluster onion (*Vethalam*). Five bacterial strains (AZO-1, AZO-3, AZO-5, AZO-6, and AJ4) which were isolated from onion rhizosphere in dry zone having the ability to fix nitrogen and solubilize phosphorus were used. These were tested along with organic fertilizer (cattle manure) and in combination with inorganic fertilizer. Field experiment was conducted in Regional Agricultural Research and Development Centre, Kilinochchi during *Maha* season 2018 and designed in Randomized Complete Block Design with triplicates. There were twelve treatments; T₁ (Control), T₂ (AZO-1), T₃ (AZO-3), T₄ (AZO-5), T₅ (AZO-6), T₆ (AJ4), T₇ (Recommended NPK), T₈ (1/3RNP + AZO-1), T₉ (1/3RNP + AZO-3), T₁₀ (1/3RNP + AZO-5), T₁₁ (1/3RNP + AZO-6) and T₁₂ (1/3RNP + AJ4). Onion bulbs were inoculated with respective strains ten minutes prior to planting. Data regarding growth, available nutrients and yield parameters including bulb length, bulb diameter and yield were recorded during the experiment and analyzed by using statistical package (SAS 9.1). The highest height (21.627 cm) and total leaf number per plant (18) were recorded in T₁₁ (1/3RNP + AZO-6) and highest bulb length (4.93 cm) and bulb diameter (2.973 cm) were noted in T₁₂ (1/3RNP + AJ4). Nutrient availability in rhizosphere soil at 45 days after planting, available nitrogen was highest (2.24 mg/100 g) in T₈ (1/3RNP + AZO-1) and there was no significant difference between T₈ (1/3RNP + AZO-1), T₆ (AJ4), T₁₁ (1/3RNP + AZO-6) and T₁₂ (1/3RNP + AJ4). Significantly higher available P was observed in T₃ (AZO-3) and T₅ (AZO-6). Available K was highest (39.82 ppm) in 1/3RNP + AZO-6 (T₁₁) and lowest (15.49 ppm) in AZO-1 (T₂). All the inoculated plants showed significantly ($P=0.05$) higher yield compared with control except T₉ (1/3RNP + AZO-3) and T₃ (AZO-3) and comparable to recommended fertilizer. Yield (8.586 t/ha) was obtained in T₁₁ (1/3RNP + AZO-6) and it was followed by T₁₂ (1/3RNP + AJ4). Therefore, present study concludes that the strains AZO-6 and AJ4 with organic fertilizer have the potential to improve onion growth and yield with or without inorganic fertilizer under field conditions. It is suggested that further field experiments under various agro ecological region is necessary to confirm the performance of selected strains.

Keywords: Available nutrients, Bacterial strains, Onion, Yield