STUDY ON ROOT TRAITS OF DIFFERENT RICE VARIETIES (*Oryza sativa* L.) FOR NUTRIENT USE EFFICIENCY

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Plant nutrients play a significant role in the growth and development of the rice plant (*Oryza sativa* L.). Today rice cultivation is heavily dependent on chemical fertilizers. Breeding rice varieties for improved nutrient use efficiency (NUE) is one of the most feasible ways to increase grain yields under low fertility conditions. Therefore, the study focused on the root architecture enhancing the NUE of different rice varieties under nutrient sufficient and deficient conditions. A field experiment was conducted under nutrient sufficient and deficient conditions with 17 rice varieties with the objective of selecting rice varieties with high number of S-type roots which are crucial to increase the NUE of plants. The root system was studied at the panicle initiation stage from uprooted plants. The root morphology was analysed using the Winrhizo scanner. Rhizotron structure was prepared to observe and analyse the variations in root architecture. Results of root scanning indicated that the number of S-type roots was significantly higher ($p<0.05$) in nutrient sufficient conditions compared to the nutrient deficient conditions. In the rhizotron study, the root system architecture of selected rice varieties was analysed and grouped into 0°-30°, 30°-60° and 60°-90° angles. The highest number of S-type roots in 0°-30° was observed in Bg 375. The H4 variety showed the highest number of S-type roots in 30°-60° and 60°-90° angles. The ratio between L-type roots to S-type roots of H4 in 60°-90° angle was 1:20. The ratio between main roots to S-type roots of H4 in 60°-90° angle was 1:175. Therefore, H4 and Bg 375 varieties have a potential to be used as parents for the breeding of rice varieties with high NUE.

Keywords: L-type roots, Rhizotron, Root system architecture, S-type roots