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# Agronomic Evaluation of the Rice Genotypes for High Nitrogen Use Efficiency

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**N**itrogen (N) significantly impacts the growth and yield of crops. It is an essential nutrient and often the most yield limiting nutrient in rice production around the world. Nitrogen Use Efficiency (NUE) is related to the efficient uptake, utilization and remobilization of the available N by the crops. NUE is both, economically and environmentally, a highly desirable trait. Rice has a low NUE varying from 21-33% and there is an urgent need to increase NUE to mitigate the economic and environmental costs of rice production. In order to identify the N-use efficient genotypes of rice, a field experiment was conducted during wet kharif seasons (2017, 2018) at the research farm of Indian Agricultural Research Institute, New Delhi, in a split-plot design with two replicates, to screen ten genotypes of rice for higher NUE. Nitrogen treatments comprised of the recommended dose of N (RDN 120 kg ha<sup>-1</sup>) i.e. 100% RDN; 50% RDN; and 0% RDN (no-N). Various agronomic parameters like plant height, dry

matter production, number of tillers, panicle length and weight, number of grains in each panicle and grain weight were recorded. The data on root growth traits like root dry weight, root length, root diameter, root surface area and root length density were also recorded and analyzed by root image analyzer (WIN-RHIZO) to compare the root system architecture of rice genotypes under different nitrogen doses. The genotypes, Nidhi, CR Dhan 310, and Nagina 22 recorded high values of harvest index and grain yield efficiency index and also had significantly higher grain yield and NUE over all other genotypes. They also showed improved root growth traits, which could be linked to the higher N uptake and use efficiency. The study has the potential to significantly reduce the need for N fertilizer and simultaneously improve food security, augment farm economics and mitigate greenhouse gas emissions from the rice ecosystem.

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