Entry No. IRRC-0064

Category	: International Rice Research Conference
Select Theme	: Systems physiology
Keyword 1	: Root biology
Endorsement email	:
Keyword 2	: Nutrients (such as mineral uptake, translocation, and regulation)
Keyword 3	:
Title of Entry	: Effect of Nitrogen-Stressed Environments on the Root System Architecture (RSA) of Rice Genotypes
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Adequate and balanced nutrition is essential for satisfactory crop growth and production. Nitrogen (N) has a pronounced and dramatic influence on the growth and yield of crops. N fertilization significantly influences the crop root growth by increasing soil nutrient avail¬ability Enhancement of nitrogen use efficiency (NUE) is a key factor to sustain and increase the yield o rice. N losses occur through ammonia (NH3) volatilization, leaching, soil erosion, surface runofl and denitrification from soil-plant systems. Roots play an essential role in plant growth and development by providing anchorage and taking up nutrients and water from the soil. The root system architecture (RSA) governs the growth and response of the plant to the environmental conditions and subsequently, the yield. We conducted a field experiment during kharif season (2017) at the research farm of Indian Agricultural Research Institute, in a split-plot design with two replicates, with the objective to characterize the root growth and development in ten genotypes of rice under nitrogen sufficient and nitrogen deficit environments. Nitrogen treatments included recommended dose of N (RDN 120 kg ha-1) i.e. 100% RDN; 50% RDN; and 0% RDN (no-N). Roots were sampled at the flowering stage at the three levels of nitrogen and the data on root dry weight, root length, root diameter, root surface area and root length density was recorded and analyzed by root image analyzer (WIN-RHIZO). RSA was significantly affected by the availability of N. Plants grown under 100% RDN (adequate N) had a relatively higher and profuse root growth rate as compared to the nitrogen limiting treatment. The root growth traits varied with genotypes and enhanced with increased levels of nitrogen, which could be associated with better nutrient uptake and higher NUE. The presented results can contribute to a better understanding of the effects of nitrogen fertilization on the root system development and in the development of N use efficient genotypes and subsequently, to provide further knowledge required to adapt crops to their highly variable environments.

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