

Category	: International Rice Research Conference
Select Theme	: Systems physiology
Keyword 1	: Salinity tolerance
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Title of Entry	: Physiological and Biochemical Responses of Selected Rice Varieties Grown Hydroponically at Different Salt Concentrations
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Abstract : Salinity is one of the important abiotic stresses that affect growth, physiology, biochemistry and molecules of plants. Salinity also affects metabolic activity of plants by influencing the ionic balance of nutrients present in the water available to the plant. Selection of rice varieties and identification of physiological and biochemical activities which are responsible for salt tolerance are important requirements for salt affected lands. An experiment was conducted in the poly-tunnel at the University of Peradeniya, Sri Lanka during the period from February to June, 2014 to compare growth, the role of Na⁺/K⁺ on physiological responses and biochemical activities among selected five rice varieties differing in salt tolerance ability in order to gain more understanding of the mechanisms of salt tolerance at seedling and heading stage which were grown under hydroponic condition with different salt concentrations. The experiment was conducted as two factor factorial with five rice varieties (improved and traditional) as At 308, Adakari, Pokkali, At 353 and Pachaperumal and three salt levels 4 and 6 dsm-1 with the control 0 dsm-1 in completely randomized design with five replicates. Physiological parameters of plant height, leaf greenness (SPAD reading), relative water content, Na and K concentrations and biochemical parameters of proline, starch, Malondialdehyde (MDA) concentrations and total antioxidant activity were measured. Plant height, relative water content and starch concentration in leaves decreased with increased salt levels. However, proline concentration increased with increased salt levels. SPAD reading, MDA concentration and Na/K ratio varied with varieties. Salt tolerant varieties showed higher leaf greenness (SPAD reading), lower MDA concentration and Na/K ratio. Among the tested varieties, Pokkali and Adakari were identified as highly salt tolerant and At 353 and Pachaperumal as the salt tolerant because these varieties showed more tolerant nature at vegetative stage compared to heading stage. At 308 was salt sensitive. It could be concluded that for screening of rice varieties to salt tolerance, relative water content in leaf, Na⁺/K⁺ ratio, SPAD reading, proline and MDA concentrations and total antioxidant activity could be used effectively. Key words: Salinity tolerance, traditional and improved rice varieties, Biochemical and physiological traits, hydroponics.

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