

Category: Agriculture

Morpho-Physiological Response of Rice (*Oryza Sativa* L.) Genotypes to Salinity Stress at Seedling Stage

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ABSTRACT

Salinity stress would significantly reduce seedling growth performance of rice. In addition, salinity also affects physiological and metabolic process mainly the osmotic and ionic balance of the cells. Hence, the present study was conducted to evaluate morpho-physiological and biochemical response of selected rice genotypes to salinity stress at seedling stage. Twelve rice genotypes were used in the pot-trial experiment including two checks namely Pokkali (tolerant) and MR297 (susceptible). The experiment was conducted in a split plot design with three replications. Three salinity levels involved were L1 (normal fresh water), L2 (saline water at 12 dSm⁻¹), and L3 (saline water at 24 dSm⁻¹) as the main plot while rice genotypes as the sub-plot. Salinity stress was imposed for 14 days starting from 21 days after sowing. In overall, L3 salinity stress significantly reduced 47.41% of all seedling growth attributes for all genotypes except for Pokkali (V11) as compared to control condition. Meanwhile, Haiboq (V9) and Basmati 370 (V3) recorded significantly similar response as the MR297 (V10). The trend of chlorophyll content reduction could be seen in all genotypes under L2 and L3 salinity stress with average 77.72% reduced over control condition. In contrast, proline content was increased over 7 folds in all genotypes as level of salinity increases except for V11. Proline may function as a signal metabolites thus higher proline content indicates that the plant is under stress. In conclusion, chlorophyll and proline content may be used as indicators of sensitivity to salinity stress in rice cultivars along with the morphological growth responses.

Keywords: Chlorophyll, Proline, Salinity stress, Rice