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Development of efficient protocol for screening of rice genotypes using physiological traits for salt tolerance

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Abstract

Salinity is one of the major abiotic stresses that severely affect crop production throughout the world; especially rice plant which is generally categorized as a typical glycophyte as it cannot grow in the presence of salinity. Phenotypic resistance of salinity is expressed as the ability to survive and grow in a salinity condition. Salinity resistance has, at least implicitly, been treated as a single trait. Physiological studies of rice suggest that a range of characteristics (such as low shoot sodium concentration, compartmentation of salt in older rather than younger leaves, high potassium concentration, high K^+/Na^+ ratio, high biomass and plant vigour) would increase the ability of the plant to cope with salinity. Criteria for evaluating and screening salinity tolerance in crop plants vary depending on the level and duration of salt stress and the plant developmental stage. Plant growth responses to salinity vary with plant life cycle; critical stages sensitive to salinity are germination, seedling establishment and flowering. We have established a standard protocol to evaluate large rice germplasms for overall performance based on specific physiological traits for salt tolerance at seedling stage. This protocol will help in identifying germplasms which can perform better in the presence of different salinity treatments based on single trait and also combination of different physiological traits. The salt tolerant germplasm can be taken forward into developing better varieties by conventional breeding and exploring genes for salt tolerance.

Key words: Rice, Salinity, Physiological traits

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