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Screening and identification of Rice Genotypes for tolerance at cellular level using Temperature Induction Response Technique

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Abstract:

The major abiotic stresses that are predicted to worsen as the consequences of climate change include drought and high temperature stresses. These abiotic stresses act as yield limiting factors in the unfavorable environments of tropical Asia. Incorporating stress tolerance into high-yielding varieties has proven to be a very effective approach to developing varieties that can cope with these situations. Thus, identifying rice genotypes that are tolerant to drought and high temperature stresses and resilient to changing climate is need of the hour.

The present study aimed at screening and identifying rice genotypes with higher tolerance at cellular level (TCL) to high temperature stress. A novel approach called temperature induction response (TIR) technique was used to phenotype a set of diverse rice genotypes comprising 96 numbers for tolerance at cellular level. The genotypes showed significant genetic variability in parameters linked with intrinsic tolerance. The per cent reduction in recovery growth (%RRG) varied from 45 per cent in N22 to 100 per cent in Moroberekan and other nineteen genotypes, with a mean of 78.9 per cent. Genotypes such as Padmini, Sahbhagidhan, N22, Luna Barial, CR DHAN 201 And Luna Sankhi recorded the highest intrinsic tolerance in terms of lowest reduction in recovery growth. This study identified rice genotypes that are having higher tolerance at cellular level under high temperature stress.