Screening of Selected Greengram Germplasms for Salt Tolerance through Germination Traits

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ABSTRACT

Eighteen germplams of greengram were selected to screen for salt tolerance using Relative Salt Harm Rate (RSHR). The study was also aimed to evaluate the genetic diversity based on 10 germination traits. Factorial analysis with two factors (Factor 1: Salinity with five level and Factor 2: Germplasms with 18 level) in a completely randomized design with three replications were carried out. Cluster Analysis and Principal Component Analysis (PCA) were done using NTSysPC Software. All 10 germination traits were statistically significant ($p< 0.01$) for genotypes (G), salinity (S) and genotype x salinity (G X S) except hypocotyl length for G x S and seedling dry weight for both S and G X S. Four genotypes viz., KM-12-37, PM-02, KM-12-15 and KM-12-46 showed higher salt tolerance (Grade 1) upto 75mM NaCl concentration. On the other hand at 100 mM NaCl, 7 genotypes (Meha, KM-12-37, PM-02, SM-12-78, KM-12-15, SM-11-67 and KM-12-46) were considered as salt tolerant (Grade 2). The principle Component Analysis identified the germination traits that best separated the genotypes for their tolerance to salinity. It was observed that germination percent, germination rate and germination index consistently contributed positively to both PC1 and PC2. The maximum positive contribution of seedling vigour index followed by seedling length was observed at all the levels of salinity. In contrast hypocotyl length contributed negatively to PC2 irrespective of salinity level. From the cluster analysis, it was found that with the increase of salinity, the cluster members were changed keeping the no of cluster unchanged. Based on the findings of the PCA and cluster analysis coupled with the findings of relative salt harm rate the germplsms KM-12-37, PM-02, KM-12-15, Meha, SM-12-78, SM-11-67 and KM- 12-46 could be considered as the resource base materials which may contribute in greater way in the development of salt tolerant genotypes in greengram.

Keywords: Salinity Screening, Greengram, Principle Component Analysis