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Optimization of Screening for Salt Tolerance in Soybean for Mutation Breeding

The world faces great challenges to maintain sustainable food production to feed growing population in the era of climate change. Crop production is increasingly affected by abiotic stresses such as drought, salinity and heat stress. Mutation breeding provides attractive options to generate genetic variability for abiotic stresses. The PBGL has been involved in developing efficient and reliable screening methods for development of mutant varieties tolerant to abiotic stresses such as drought, salt and heat stress. Screening packages were developed for different crops under different conditions in the laboratory, glasshouse and open field. Twenty soybean genotypes were used for salinity screening using hydroponic culture. Sodium chloride (NaCl) was used at 0, 5, 10 and 15 dS/m concentrations for salinity induction in hydroponic system with modified Ishida's nutrient solution. Salinity stress was imposed at early vegetative stage (after nine days from transplanting of seedlings in hydroponic) and continued for more than 6 weeks. Measures were taken for plant growth traits like plant height and leaf number, chlorophyll fluorescence etc. Genotypes had shown variation in sensitivity to salinity stress with increasing in the intensity and time of exposure to stress. Combined differential scoring of these parameters enabled classification of the 20 soybean genotypes into five classes; highly sensitive, sensitive, moderately sensitive, tolerant and highly tolerant to salinity. Tolerant genotypes were further validated under soil condition. The extended treatment with different levels of salinity enables the classification of the genotypes based on their tolerance threshold level that can be adapted for screening of mutant populations for salt tolerance. The matrix of salt concentration and time of exposure to stress provides options based on the targeted environment.

Country or International Organization

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