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Identification of S1 families as diploid pollinators for the development of salt tolerant hybrids in sugar beet

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Abstract

In order to identify and selection salt tolerant hybrids based on tolerance indices, 17 sugar beet three-way cross hybrids produced by crosses between 17 salinity improved S1 pollinators and a cytoplasmic male sterile (CMS) single cross as female, along with three control genotypes were grown in 2007 in Rudasht Station (Isfahan) under saline (12 dS/m and 8 dS/m for water and soil) and non-saline field conditions using a randomized complete block design with five replications. Five salt tolerance indices including stress susceptibility index (SSI), stress tolerance index (STI), mean productivity (MP), geometric mean productivity (GMP) and stress tolerance (TOL) were used to evaluate the white sugar yield in stress and non-stress conditions. Correlation analysis showed that MP, GMP and STI had significantly positive correlation coefficient with white sugar yield under both stress and non-stress conditions suggesting that these indices are more efficient for determining salt tolerant genotypes. Based on multivariate biplot, triple plot and cluster analysis, hybrids number 7233-29/19 * (7112*261), 7233-29/35 * (7112*261), 7233-29/34 * (7112*261), 7233-29/28 * (7112*261) and 7233-P.29 * MSC2 recognized as salt tolerant genotypes and hybrids number 7233-29/1 * (7112*261), 7233-29/5 * (7112*261) and 436 HYBRID were introduced as salt sensitive genotypes. Genotype number 7233-29/35 * (7112*261) with highest white sugar yield in stress condition was the best.

Keywords: hybrid, salt tolerance, sugar beet, tolerance index, white sugar yield.



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Evaluation of salinity tolerance in wheat varieties and its relation with Molecular markers

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Abstract

Wheat (*Triticum aestivum* L.) is a major staple food crop for more than one third of the world population and is the main staple food of Asia. Over 800 million hectares of land throughout the world are salt affected. Salinity is a major obstacle to food production because it substantially reduces the average yield of major crops. This study was conducted to evaluate the response of 24 cultivars and genotypes of wheat (*Triticum aestivum* L.) to NaCl salinity at early seedling growth and correlation between affected morphophysiological traits and molecular markers. Genotypes grew in hydroponic nutrient solution, under control (tap water) and salt stress (45 and 90 mM NaCl) conditions. Results of ANOVA analysis showed that there are significant difference (in one percent P-value) between genotypes and all of measured traits in different levels of salinity. A total of 20 RAPD and 34 ISSR primers were tested to investigate genetic diversity in 24 wheat genotypes. Of these, only 15 ISSR and 6 RAPD primers produced polymorphic bands and were further used for genetic diversity and regression analysis. Cluster analysis was performed based on jaccard coefficient and all genotypes were divided into 4 groups. Average genetic distance between genotypes was 0.486, showed that there is considerable variation among these genotypes. Regression analysis, also, revealed that there are significant relations between measured traits and using markers were investigated.

Keywords: genetic variance, ISSR markers, RAPD markers, regression analysis, salinity stress.



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Review Article

Transgressive segregation phenomena in breeding of crop plants

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Abstract

Sometimes when hybridization in quantitative traits due to occurring of transgressive segregation phenomena in F₂ and other generations, phenotypes are observed that are outside the scope of their parents. Transgressive segregates can be fixed via selfing and selection. Classical genetic and QTL studies know complementary action of genes as the main reason for the occurrence of the above phenomenon. The transgressive segregation phenomena through cross between parents with a positive and significant GCA values for all traits are somewhat predictable. It seems, to increase the likelihood of this phenomenon, bulk single seed and recurrent selection among breeding methods are the most effective methods. Transgressive segregation phenomena are widely used in the improved of various quantity characteristics such as tolerance to stresses such as cold, heat, drought and salinity.

Keywords: complementary action of genes, bulk single seed, hybridization, quantitative characteristics, recurrent selection.