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Estimation of Genetic Parameters for Cold Resistance in Bread Wheat Using Diallel Analysis

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Abstract

Low temperature is one of the most important abiotic stresses which decrease the production and the yield of crops. It is important to identify the nature of genetic control for breeding of cold tolerance. In order to estimate the genetic parameters related to cold tolerance in bread wheat, seven cultivars, namely: Norstar, Cappelle-Desprez, Morgan, Desconsoide, Sardari, Kohdasht and Zagros along with their 21 half diallel hybrids were evaluated under controlled conditions in freezing temperatures and survival percentage and LT₅₀ of genotypes in each temperature was recorded. Analysis of variance showed significant difference among genotypes. Therefore, diallel analysis was performed based on Griffing's mixed model B of method II. Genetic analysis revealed significant general combining ability for plant survival percentage whereas specific combining ability was not significant. This indicated the role of additive effects in control of cold tolerance. The high narrow heritability (87.08) and low degree of dominance (0.28) also showed the small contribution of dominance effects in controlling this trait. Among parental genotypes, Norstar showed the highest general combining ability (0.402) and also maximum mean for survival percentage (88.2).

Keywords: Cold tolerance, Diallel, General and specific combining ability, LT₅₀, Wheat

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