عنوان مقاله:

Genetic diversity evaluation for drought stress tolerance in bread and durum wheat genotypes using common and new drought tolerance indices

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خلاصه مقاله:

To evaluate the genetic diversity and the effect of drought stress on grain yield of wheat, ۵۶ wheat genotypes were evaluated for terminal drought stress tolerance in field environments in the Kermanshah of Iran during the ۲۰۱۰-۲۰۱۱ cropping season. The experiments were conducted at the Campus of Agriculture and Natural Resources, Razi University using alpha-lattice design with two replicates under two different water regimes included non-stress (normal irrigation at all stages of growth) and drought stress (end-season after flowering stage) conditions. Several new stress tolerance indices were evaluated. So that, ten drought tolerance indices including stress tolerance index (STI), relative drought index (RDI), yield index (YI), yield stability index (YSI), drought resistance index (DI), abiotic tolerance index (ATI), stress susceptibility percentage index (SSPI), sensitive drought index (SDI), modified stress tolerance index in normal irrigation (K۱STI), and modified stress tolerance index in stress irrigation (K۲STI) were calculated based on grain yield under drought (GYs) and irrigated (GYp) conditions. The result of analysis of variance indicated high significant differences among genotypes for grain yield trait. In general, terminal drought stress reduced ۲۷.۲% of grain yield. The Shiroudi, Rassoul, Darab-۲, Marvdasht, Argh, and Shiraz genotypes which are high reduction of grain yield (۶۱.۱, ۵۱.۳, ۴۸.۴, ۴۴.۱, ۴۳.۱, and ۴۳.۰%, respectively) and also genotypes ۳۱۸, Ghohar, ۳۳۰, Mahdavi, and Alamout which are low reduction of grain yield with drought stress (۴.۱, ۴.۷, ۷.۰, ۷.۵, and ۱۰.۲%, respectively). Furthermore, results showed that wheat genotypes can be classified as normal and stress situations using cluster analysis. The correlation analysis among grain yield under non-stress and drought stress conditions with different drought tolerance indices showed that STI, YI, K۱STI, and K۲STI indices were appropriate indicators to identify the high grain yield genotypes. Based on these indicators, Mughan-۱, Golestan, Navid, ۳۳۰, Darab-۲, and Bahar genotypes had the highest grain yield under both experimental conditions. Therefore, these wheat genotypes are suitable for cultivation in Mediterranean regions that are constantly exposed to drought stress at the end of the growing season, and areas with similar climatic conditions. Also, they are recommended to be used as parents for the improvement of drought tolerance in other wheat genotypes.

کلمات کلیدی:

Grain yield, Genetic variations, Water deficit stress, Wheat, Stress tolerance indices