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Evaluation on Heat and Drought Tolerance Capacity of Chickpea

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Abstract : Chickpea (Cicer arietinum L.) is one of the important legumes widely grown for dietery proteins in semi-arid Mediteranean climatic conditions. To evaluate the genetic diversity with improved heat and drought tolerance capacity in chickpea, thirty-four selected chickpea genotypes were tested under different field-growing conditions (rainfed winter sowing, irrigated-late sowing and rainfed-late sowing) in 2015 growing season. A factorial experiment in randomized complete block design with 3 reps was conducted at the Eastern Mediterranean Research Institute Adana, Turkey. Based on grain yields under different growing conditions, several indices were calculated to identify economically higher-yielding chickpea genotypes with greater heat and drought tolerance capacity. Average across chickpea genotypes, the values of tolerance index, mean productivity, yield index, yield stability index, stress tolerance index, stress susceptibility index, and geometric mean productivity were ranged between 1.1 to 218, 38 to 202, 0.3 to 1.7, 0.2 to 1, 0.1 to 1.2, 0.02 to 1.4, and 36 to 170 for drought stress and 3 to 54, 23 to 118, 0.3 to 1.7, 0.4 to 0.9, 0.2 to 2, 0.2to 2.3, and 23 to 118 for heat stress, respectively. There were highly significant differences observed among the tested chickpea genotypes response to drought and heat stresses. Among the chickpea genotypes, the Aksu, Arda, Çakır, F4 09 (X 05 TH 21-16189), FLIP 03-108 were identified with a higher drought and heat tolerance capacity. Based on our field studies, it is suggested that the drought and heat tolerance indicators of plants can be used by breeders to select stress-resistant economically productive chickpea genotypes suitable to grow under Mediteranean climatic conditions.

Keywords : irrigation, rainfed, stress susceptibility, tolerance indice
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