

ABSTRACT

Chickpea (*Cicer arietinum* L.) grown in the semi-arid environment is not usually irrigated. Knowledge about effect of reduced drought stress effects under supplemental irrigation can improve chickpea productivity. In this study, the chickpea has been submitted to supplemental irrigation during reproductive phase under rainfed conditions. The main objective was to determine the effects of supplemental irrigation regimes on grain yield performance and associated grain yield traits of selected chickpea genotypes under grown in the field conditions in arid and semi-arid areas of Kenya. Different genotypes were evaluated at Kenya Agricultural and Livestock Research Institute (KALRO-Pekerra, Marigat), Baringo county. The trial design was split plot design in randomized complete block design (RCBD) in three replicates. Various parameters were measured. There was significant differences in the test genotypes ($p < 0.05$) and traits measured with better performance with reduced drought stress due to supplemental irrigation. However, there was a high reduction among high yielding genotypes. The use of stress tolerance indices enabled identification and grouping of test genotypes into 4 with varied responses to yield losses to stress and no-stress conditions. Genotypes ICCV 00108, ICCV 92318 and ICCV 92944 are suitable for supplemental irrigation to maintain high potential yield, while ICCV 97105, ICCV 97306 and Cavar could be recommended for production under rainfed conditions. Genotypes ICCV 92318 and ICCV 97306 could be recommended for further evaluation and final release to farmers for commercial production.

Key words: Irrigation, chickpea, genotypes, drought stress indices, tolerance.