Evaluation of salt tolerance in black cumin (Nigella sativa L.) genotypes based on stress tolerance indices

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ABSTRACT

The Nigella sativa L. is an annual medicinal herb, belongs to the Ranunculaceae family. Due to the importance of Nigella sativa in food and medicine, identifying tolerant genotypes to environmental stresses especially salinity can lead to extension of its production in salt affected soils. In order to assess salt tolerance in 10 genotypes of black seed (Nigella sativa L), a factorial experiment was conducted based on completely randomized design with three replications under three salinity treatments including 2.5, 5 and 7.5 ds/m EC of sodium chloride (NaCl) which were applied in the seedling stage with irrigation water in three stages at intervals of 5 days and normal water was used as the control. In this study, stress tolerance indices including stress susceptibility index (SSI), stress tolerance index (STI), mean productivity (MP), geometric mean productivity (GMP), tolerance index (TOL), performance indicators (YI) and yield stability index (YSI) were calculated based on grain yield. Results showed that the Kazmain and Mashhad2 genotypes with high STI, GMP, MP, YI and YSI had higher performance and better stress tolerance than other genotypes. Also, the Shahreza genotype with the smallest amounts of STI, GMP, MP, YI and YSI had less performance and stress tolerance. In addition, the Khomeini Shahr and Semirom genotypes had the lowest SSI and TOL values, indicating that stress susceptibility in these genotypes was also lower than other genotypes.

Keywords: Black cumin (Nigella sativa L.), Salinity tolerance, Yield, Stress indicators