



University of Zabol
Graduate school
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**The Thesis Submitted for the Degree of Ph.D (in the field
of Plant Breeding)**

**Investigation of Adaptation and
Stability of *Sesame Indicum* L.
Germplasms in response to drought
stress**

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Abstract

Drought stress and genotype \times environment (GE) interaction are some of the most critical factors in reducing crop production in most parts of the world and Iran. Therefore, identifying and introducing stability and drought stress-tolerant genotypes is one of the ways to overcome adverse environmental conditions. To identify sesame genotypes tolerant to drought stress 104 genotypes were studied under two environments (stressed and non-stressed conditions) in an alpha lattice design with two replications at investigation farms of the Jiroft Research Center and the research farm of the Shahid Bahonar University of Kerman during the 2019 growing season. Water stress was applied at the flowering stage and depletion of 85% of available soil water. Results showed that drought stress significantly decreased most of the traits, including grain yield (40.62%), oil yield (33.01%), oil content (12.12%), number of capsules per plant (21.93%), number of seeds per capsule (18.24%), Leaf chlorophyll content (15.53%), and Stem diameter (29.09%). Giving to the biplot diagram and drought tolerance indexes genotypes JL18 (82), Chines, SG90154-71, TN78-84, JH-23 (82), JL-15 (82), JL-6, JL-14 (82) and SG90154-137 being adjacent to vectors and these genotypes can be recommended to produce a genetically modified community advised. After viewing statistically significant GE interaction for examined traits, the stability of sesame genotypes was studied. Based on the results of the AMMI model, Eberhart and Russell regression method, and other stability variables, SG90154-73, TN78-440, SG90154-74, and JL-9 (82) were the most unstable genotypes for both seed and oil yield traits. Genotypes SG90154-137, Halil, JL18 (82), Dezfol Local Cultivar, and JL-14 (82) had general adaptation and stability in seed and oil yield traits. With the results of this study, ideal genotypes with a high yield and wider adaptability can be used in breeding programs and released in agricultural fields for farmers.

Keywords: Drought tolerance index, Genotype \times Environment Interaction, Sesame, Yield Stability