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ABBREVIATION

50% fl.	**50 % flowering**
C1 ,C2	**Cycle 1 and 2 of selction**
CAT	**Catalase**
Chl	**chlorophyll**
CWSI	**crop water stress index**
EC	**electric conductivity**
ETo	**Evapotranspiration**
G.C.V	**genotypic coefficients of variability**
GA %	**genetic advance from selection**
h^2	**heritability in narrow sense**
I_G	**stomatal conductance**
L of fr.	**Length of fruiting zone**
LOP	**Leaf osmotic potential**
NC	**number of capsules**
NDVI	**Normalized Difference VegetationIndex**
ºC	**degree of temperature**
PC	**proline content**
PCV	**phynotypic coefficients of variability**
PH	**plant height**
Pop.	**Population**
POX	**Peroxidase**
R^2	**Coefficients of determination**
RAPD	**Random Amplified Polymorphic DNA**
RWC	**Relative water content**
S	**selection difference**
SPAD	**chlorophyll index**
T_{wet}	**leafwet temperature**
T_{leaf}	**canopy leaves temperature**
W.U.E	**Water use efficiency**

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Abstract

Three experiments were conducted during the three constitutive seasons (2013 , 2014 and 2015) for sesame populations which resulting from F2 in agriculture experimental station .The four populations were derived from crossing among the six parents i.e., population 1 (for Shandaweel 3* Line N.A 673* Line N.A 357-11-1), population 2 (Line N.A b14* Line N.A 289* Line N.A 560), population 3 (Shandaweel3 * Line N.A 560 *Line N.A b14) and population 4 (Line N.A 560* Line N.A 289* Line N.A 357-11-1) which were grown in 2013 season. Seeds of F_2 plants were planted in separate rows. Visually, 1200 F_2 plants were selected according to phenotype; giving preference to drought tolerance. Each plant was harvested separately and planted in a separate row in the F_3 generation under three water regimes, 300 plants for each water regime in 2014. Selection of plants from the planting in the F_3 generation was done in the same way. According to some yield components, 25 F_4 families' plants were selected from each combination and planted under the three water regimes in 2015. At harvest, the best 10 lines per combination were selected based on drought tolerance traits. The results can be summarized as follow: The results implied that there were considerable genetic variations among evaluated populations. The results clearly indicated that any change in the amount of irrigation water less than optimum condition reduces the1000-seed weight and yield. The population No.4 which had high RWC, WUE, proline and enzymes activity under stress conditions and may be considered more drought tolerance. The results inveterate the effectiveness of the RAPD markers for the detection of polymorphism among sesame genotypes based on estimation of similarity coefficients for the identification of genotypes and hybrids by distinctive fingerprints. Thermal images were more effective for selecting sesame genotypes for drought.

Key words	*SesamumindicumL.*,drought, NDVI, Infra red thermal images, Enzymes, RAPD, RWC, WUE, proline and RAPD markers