



Department : Crop Science

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Title of Thesis **BREEDING FOR DROUGHT TOLERANCE IN MAIZE**
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ABSTRACT: *This study carried-out in four successive summer seasons (2015 to 2018) at the experimental farm of the faculty of agriculture, Menoufia University, in Shebin El-Kom, Egypt.*

In 2015 season, S1 recurrent selection procedure was provided (Tep#5 and Gemmeiza yellow), where 200 S0 plants from each population were selfed to produce S1 progenies.

In 2016 season, kernels of 100 S1 lines that selected from each two populations were separately sown for evaluation under two water regimes, i.e normal irrigation (NI) and drought stress conditions (DS).

In 2017 season, the highest 10% of S1 progenies (10 S1 progenies of first Population (Tep#5) and 10 % S1 progenies of second Population (GMY) were planted for randomly mated by bulking pollen from the S1 plants. kernels harvested, four blends of seeds were obtained (Tep#5-NI, Tep#5-DS, GMY-NI and GMY-DS).

In 2018 summer season, for each population the original cycle (C0) and the improved cycle (C1) were evaluated under normal irrigation (NI) and drought stress (DS).

The results could be summarized as follows:

Evaluate of 100 S1 progenies (Tep#5 and Gemmeiza yellow) for drought tolerance.

Analysis of variance showed significant differences among the genotypes (S1 progenies) for all studied traits under both normal and drought stress conditions for two populations. A significant average reduction of 59.88% and 61.93% in grain yield/plot of the 100 S1's for Tep#5 and Gemmeiza yellow respectively, due to drought stress. The superiority of the selected 10 S1's over the 100 S1's in grain yield was higher under drought stress than under normal conditions.

Evaluation of the effectiveness of S1 recurrent selection of the two cycles for Tep#5 and Gemmeiza yellow populations under normal and drought conditions.

One cycle of S1 recurrent selection using water-stress as a selection environment caused a significant actual improvement of grain yield of the newly developed populations (Tep#5-DS and GMY-DS) over its original populations (Tep#5 and GMY) of 15.47 and 12.78% under water stress condition. The improved populations Tep#5-NI and GMY-NI developed by using normal irrigation as a selection environment showed significant actual improvements in grain yield under normal irrigation (12.46 and 9.06%) environment. Both water stressed and non-stressed selection environments were efficient in improving grain yield under target environments. The two improved populations showed significant superiority in grain yield/fed over origin population under normal and drought stress conditions.

Key words: *Maize, Populations, Recurrent selection, Drought tolerance, physiological characters, yield and its components.*
