

## Abstract

An Egyptian gene pool i.e., composite-21 yellow maize was used to estimate genetic component e. g., additive and dominance component for  $S_1$ -lines and Half-sib families generated through recurrent selection for earliness, morphological, physiological and pathological characters as well as yield and yield components. during 3 summer seasons; 1996, 1997 and 1998. One hundred male groups (half-sib families) and at the same time 200  $S_1$ -lines were developed from "composite-21" yellow population in 1996 summer season. The genetic components i.e., variance of males  $\delta^2m$  and females  $\delta^2f$  were employed to estimate additive and dominance genetic components in Half-sib families according to **Comstock and Robinson (1948 and 1952)**. Additive genetic variance and environmental one were estimated in  $S_1$ -lines according to **Embig *et al.*, (1972)**. Six yellow maize genotypes (C1); 2  $S_1$ -lines, 2 Half-Sib families and  $S_1$ -lines (100%) and 1-Half-Sib (100%) as well as three local checks of yellow maize were evaluated under three selection interstices; 10, 20 and 100% in randomized complete block design under early and late sowing dates at Gemmeiza (Middle Delta) and Sids (Upper Egypt).

The obtained results of  $S_1$ -lines showed in 1997 that earlier plants was observed for days to 50% tasseling and silking, higher plant height, ear height, ear position, ear leaf area, leaf angle and chlorophyll (b) after flowering at Gemmeiza location as compared to Sids one. Phenotypic variance was higher in Sids location than Gemmeiza one for most studied characters.

Meanwhile, higher and significant genetic (additive) and environmental variance were recorded for most studied characters in Upper Egypt location than Middle Delta one. The results of H.S. families indicated that earliness characters tended to be earlier at Gemmeiza location than Sids. Twelve and ten characters out of 22 gave high and significant genetic variance at Gemmeiza location and Sids, respectively. Additive genetic variance was the prevailed type in the genetics of 17 characters at both locations, meanwhile, dominance genetic variance was the prevailed type in the gene expression of 5 characters at both location. Generally, narrow sense heritability was low for 12 characters at both locations for Half-Sib families. The evaluation during 1998 season indicated that  $S_1$ -lines recurrent selection was more effective in improving most studied characters, except earliness characters. These information are of great interest for maize breeder to develop, improve and release genotypes of maize through  $S_1$ -lines recurrent selection.

## Content

	Page
1. Introduction	1
2. Review of literature	3
2. 1. Mean performance and genetic parameters for selfing progenies.	3
2. 2. Mean performance and genetic parameters for half-sib families .	25
2. 3. Comparison between selfing progenies and half-sib families for improving cycles of various morphological, orphophysiological, disease, yield and yield components characters .	38
3. Materials and Methods	57
3. 1. Description of plant materials	57
3. 2. Experimental design	58
3. 2. 1. Selfing generation	58
3. 2. 2. Half-sib families	58
3. 3. Field procedures	59
3. 4. Collected data	59
3. 4. 1. Earliness characters	59
3. 4. 2. Morphological characters	59
3. 4. 3. Physiological characters	60

## II

3. 4. 4. Pathological characters	60
3. 4. 5. Yield and yield components	60
<b>3. 5. Selection intensity</b>	61
<b>3. 6. Evaluation the improved cycles</b>	62
<b>3. 7. Check genotypes</b>	62
<b>3. 8. Quality characters</b>	63
<b>3. 9. Statistical analysis</b>	63
3. 9. 1. S1-line experiments	63
3. 9. 2. Half-sib family selection	67
<b>3. 10. Standard error of estimates</b>	73
3. 10. 1. Standard error for S1-line	73
3. 10. 2. Standard error for Half-sib family selection	74
<b>3. 11. Heritability estimates</b>	75
3. 11. 1. S1-lines experiment	76
3. 11. 2. Half-sib family selection	76
<b>4. Results and Discussion</b>	77
<b>4. 1. Genetic component and genetic behavior of S<sub>1</sub>-lines derived from composite-21 yellow population</b>	77
4. 1. 1. Earliness characters	77
4. 1. 2. Morphological characters	82
4. 1. 3. Physiological characters	93

### III

4. 1. 4. Pathological characters	100
4. 1. 5. Yield and yield components	103
<b>4. 2. Component of genetic variance and genetic behavior of half-sib families resulted from composite-21 yellow maize population</b>	120
4. 2. 1. Earliness characters	120
4. 2. 2. Morphological characters	124
4. 2. 3. Physiological characters	137
4. 2. 4. Pathological characters	143
4. 2. 5. Yield and yield components	147
<b>4. 3. Evaluation of the selected maize lines of both S1-lines and Half-sib families under two selection intensities; 10 and 20%</b>	165
4. 3. 1. Earliness characters	165
4. 3. 2. Morphologic characters	168
4. 3. 3. Physiological characters	177
4. 3. 4. Yield and yield components	182
4. 3. 5. Quality characters	193
4. 3. 6. Pathological characters	195
<b>5. Summary</b>	199
<b>6. References</b>	226
<b>Arabic Summary</b>	1