INTRODUCTION

Maize (*Zea mays* L.) is one of the most important cereals in Egypt due to its vast acreage, total production and cash value. The crop is essential for human consumption and livestocks. Moreover, it is also demanded for several industrial purposes, such as manufacturing of starch and also for cooking oils.

Many efforts are nowadays devoted to increase corn productivity through genetical improvement. To carryout a successful breeding programme, the breeder should have enough knowledge about the type and relative amount of genetic variance components and their interaction by environments for the characters in question.

Though a boom in corn production accurred in Egypt in the last two decades, yet the production is far behind what is required locally. The total cultivated area of maize amounted for 1.558.000 feddan with a total grain yield of 4.963.000 ton[*]. The average gain yield per feddan was about 22.760 Ardab[**] in year 1997. The total production supplies by 80 % of the total consumption. That is, a gap of 20 % has to be filled via importation. Intuitively, one way to increase production of corn is to increase the area allotted to the crop. A second way is the production of outstanding hybrids that would yield better than those already at hand. Because hybrid production capitalize on the fact that inbreds derived from certain diverse parents

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[*] Statistical and Agricultural Economic Research Institute, Ministry of Agriculture, 1997.

[**] One ardab = 140 kg.

combine well and produce progeny with outstanding performance. Thus, the first steps in hybrid corn production are to produce inbred lines and evaluate these inbreds to pinpoint those that would combine well with other inbreds to produce high yielding hybrids. This is not an easy task because to locate inbreds that would find a hybrid that qualifies the criteria is always burden some. Kiesselbach according to Allard (1960) reported that out of the more than 100.000 inbred lines, only 60 of them proved good enough to be used commercially.

Several corn inbreds were produced by the experimental and Research Station at Moshtohor, University of Zagazig, Banha branch. Because in maize breeding performance of inbred lines per se does provide an appropriate measure of their value in hybrid combination for most traits of agronomic importance, therefore, the value of any inbred ultimately rests on the ability to produce superior hybrids in combination with other inbreds. Hence, the value of those inbreds has to be known in order to find out whether they could be recommended for commercial use or not and to determine their future breeding merit. In this research, we report on heterosis, and combining ability . Hence, the main objectives of this investigation could be summarized in the followings :

1- To estimate the amount of heterosis .

2- To evaluate the general and specific combining ability (GCAand SCA) and their interaction by season.

3- Finally, it is hoped that the present study may help to identify inbreds of maize having higher yielding potentiality.