SUMMARY

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This study was conducted in th This study was conducted in the Experimental Farm and Gemplasm Preservation Laboratory of Department of Horticulture, Faculty of Agriculture Moshtohor Zagazig university, Benha Branch, and in the Research station of Egypt High Tech. Seed Company, Kalubia , Egypt during summer seasons of 1999, 2000 and 2001. Eight highly inbred lines of sweet corn (*Zea mays* L.) were crossed to produce a non– reciprocal diallel set of crosses , i.e., 28 single crosses. The parental inbred lines along with the 28 single crosses F_1 hybrids were planted in the field during summer seasons of 2001 for purpose of evaluation. Plants were left to open pollination, except the plants in the ridges which were assigned for chemical analysis The tassells and silks of such plants were isolated by Bergamine paper bags. Each individual plant of these ridges was hand pollinated using pollen grains calculated from the isolated plants within the same ridge to avoid any possible direct effects for the cross pollination among the different parental genotypes and F_1 hybrids on the chemical contents of the kernels.

The individual plants of the different genotypes were evaluated

for the following characters.

- Tasselling date
- Silking date

- Plant height
- Position of 1st ear on the plant (ear height)
- Weight of fresh husked ears /plant
- Weight of fresh huskless ears /plant
- Dry weight of kernels
- Ear length
- Number of rows/ear
- Total sugars content in kernels, directly after harvesting of green ears
- Percentage of total sugars reduction in kernels of fresh husked ears stored at room temperature ($30\pm3^{0}C$) for days.
- Starch content in kernels, directly after harvesting of fresh husked ears
- Percentage of starch increase in kernels of green ears stored at room temperature ($30\pm3^{0}C$) for 4 days.

The results can be summerized as follows:

1- Mean square values associated with the different studied characters were significant for parental inbred lines, F_1 hybrids, and parental genotypes versus its F_1 hybrids, indicating the presence of genetic variability among parental genotypes and related F_1 hybrids concerning these characters.

2- Mean square values for general and specific combining abilities for the different studied characters were significant indicated the presence of both the additive and non-additive

type of gene actions effects on the inheritance of these characters. However, the additive type of gene was more important than the non-additive type of gene action in the inheritance of tasselling date, silking date, ear length, number of rows/ear, total sugars content in kernels, directly after harvesting of green ears, Percentage of total sugars reduction in kernels of green ears stored at room temperature ($30\pm3^{0}C$) for 4 days, starch content in kernels, directly after harvesting of green ears ,an percentage of starch increase in kernels of green ear stored at rooms temperature. While in case of the characters plant heigh, weight of fresh husked ears/plant, weight of fresh huskless ears /plant and dry weight of kernels, the non-additive type of gene action was more important than the additive type in the inheritance of these characters.

3- The parental inbred line M-1-2 had the highest percentage of total sugars content in kernels, measured directly after harvesting of green ears. It is suggested that this parental inbred line can be used as a source for genes controlling high sugars content in kernels.

4- The parental inbred line M-2-2 can be considered the best source for genes controlling slow reduction in kernel sugars content of green ears stored at room temperature.

5- The lowest percentage of starch seed content was associated with the parental genotype M-2-1, while the same parental genotype had the highest percentage of starch increase in kernels of the green ears stored at room temperature (30 ± 3 ^{0}C) In addition, the parental inbred line SIO4 had the highest

percentage of starch content in kernels directly after harvesting of green ears, while within 4 days of storing at room temperature, it recorded the lowest percentage of kernel starch increase.

6- The results indicated the importance of selecting for both high sugar contents and low starch contents in kernels of sweet corn ears directly after harvesting and, in the same time after storing at fresh ears of room temperature for 4 days.

7- The narrow sense heritability estimats for all studied characters ranged from very low to above low, indicating important role of the environmental effects on the expression of these characters. Based on these results selection for the improvement of such characters in the segregating generation should be performed according to family mean basis in replicated experiments.

8- Positive correlation was detected betwee weight of fresh husked ears/plant and each of plant height (r=0.88), ear position on the plant (r=0.63), and ear length (r=0.81). In addition, negative correlation between weight of fresh husked ears/ plant and each of dry weight of 100g fresh kernels (-0.49), number of days to tasselling (-0.84) and number of days to silking (-0.76).

9-Positive correlation was observed between plant height and each of ear position (r=0.70) and ear length (r=0.63).

10-Positive correlation coefficients were detected between percentage of total sugars in fresh kernels and each of ear position (r=0.63) and ear length (r=0.50), while, negative

correlation coefficients were observed between percentage of total sugars content in fresh kernels and each of number of days to tasselling (r =-0.48) and number of days to silking (r=0.42)

11-Simple negative correllation was observed between percentage of starch content of kernels and each of percentae of starch increase in kernels of green sweet corn ears stored at room temperature (30±3°C) for 4 days (r=-0.67)