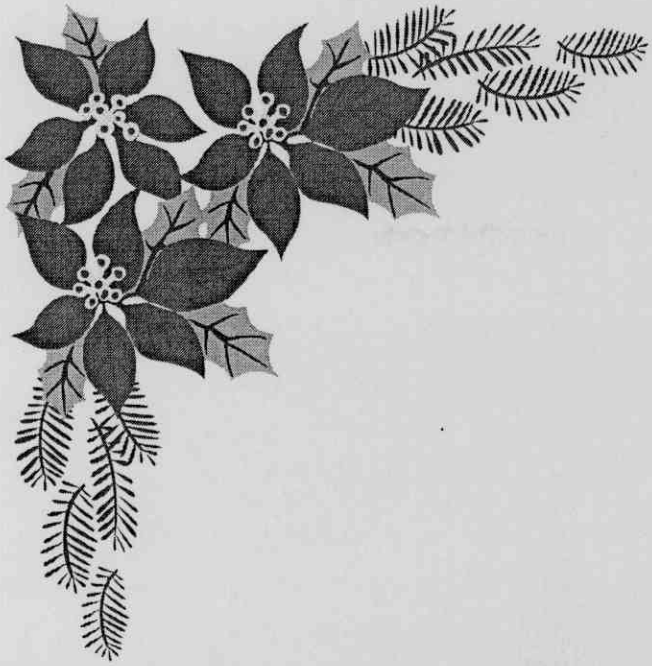
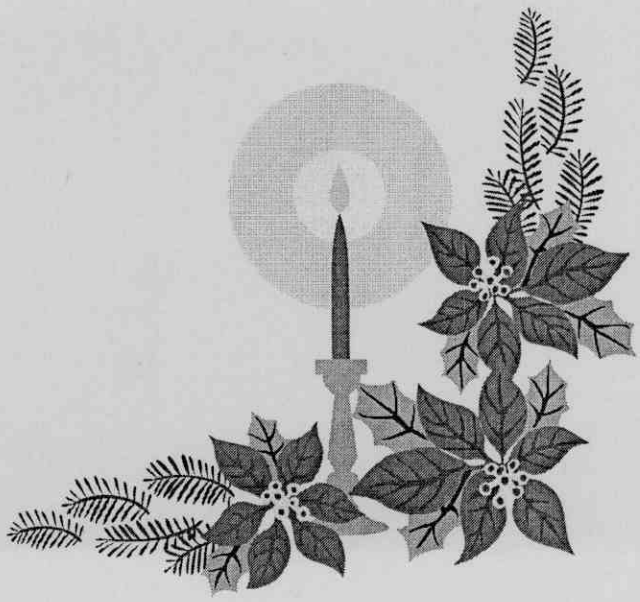


SUMMARY



V. SUMMARY

The aim objective of this investigation was to determine heterosis and types of gene action for some growth and yield traits i.e. days to heading, days to maturity, plant height, plant height to flag leaf, length of flag region, number of tillers/plant, spike length, number of spikes/plant, number of spikelets/spike, 1000-grains weight, number of grains/spike, grain yield/plant, straw yield/plant, total weight of plant and harvest index.

To achieve this target F_1 and F_2 of half diallel cross between eight wheat genotypes namely, Gemmeiza 7 (P_1), Gemmeiza 9 (P_2), Sakha 94 (P_3), line 1 (P_4), line 2 (P_5), line 3 (P_6), line 4 (P_7), line 5 (P_8) representing wide range of variability in most of the traits studied were utilized.

In 2004/2005 season, crossing was made with all possible combinations among the eight parental excluding reciprocals and evaluated in successive seasons 2005/2006 in a randomized complete block design with three replications. In 2006/2007 season, experiment was conducted, involved the parental lines and F_2 crosses.

Data were recorded on 10 and 60 individual guarded plants, chosen at random from each plot for F_1 and F_2, respectively. Analysis of variance was performed for the traits studied in F_1 and F_2 was carried. Heterosis mean squares and effects for both generation were calculated.

The date were genetically analysis by the procedures by Griffing (1956) and Hayman (1954a).

The obtained results can be summarized as follows:

1- Analysis of variance, means and heterosis:

A-F_1-generation:

1- Significant genotype mean squares were detected for all the traits studied.

2- Mean squares due to parents were significant for all the traits studied.

3- Line 3 behaved as the earliest one for heading date. The parental Sakha 94 was on the top of the tested parental lines in grain yield per plant.

4- The three crosses P_1xP_6 (Gemmeiza 7 x line 3), P_3xP_8 (Sakha 94 x line 5) and P_4xP_5 (line 1 x line 2) had the highest grain yield per plant.

5- Mean squares for parent vs. crosses were significant for all the traits studied, except spike length and 1000-grains weight.

6- For grain yield per plant, two crosses expressed significant negative heterotic effects relative to mid-parent and better parent.

7- The crosses P_1xP_2 (Gemmeiza 7 x Gemmeiza 9), P_1xP_3 (Gemmeiza 7 x Sakha 94), P_1xP_4 (Gemmeiza 7 x line 1), P_1xP_3 (Gemmeiza 7 x line 3), P_2xP_8 (Gemmeiza 9 x line 5), P_3xP_4 (Sakha 94 x line 1), P_3xP_8 (Sakha 94 x line 5), P_4xP_5 (line 1 x line 2), P_4xP_6 (line 1 x line 3), P_4xP_7 (line 1 x line 4), P_4xP_8 (line 1 x line 5), P_6xP_7 (line 3 x line 4) and P_7xP_8 (line 4 x line 5), for grain yield per plant, the crosses P_1xP_3 (Gemmeiza 7 x Sakha 94), P_1xP_4 (Gemmeiza 7 x line 1), P_1xP_6 (Gemmeiza 7 x line 3), P_1xP_7 (Gemmeiza 7 x line 4),

P_2xP_3 (Gemmeiza 9 x Sakha 94), P_3xP_6 (Sakha 94 x line 3), P_4xP_6 (line 1 x line 3), P_4xP_7 (line 1 x line 4) and P_6xP_7 (line 3 x line 4) for total weight of plant and the crosses P_1xP_2 (Gemmeiza 7 x Gemmeiza 9), P_1xP_4 (Gcmmeiza 7 x line 1), P_1xP_5 (Gemmeiza 7 x line 2), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_3xP_8 (Sakha 94 x line 5), P_4xP_6 (line 1 x line 3), P_5xP_8 (line 2 x line 5), P_6xP_8 (line 3 x line 5) for number of kernel/spike exhibited significant positive heterotic effects relative to the better parent.

F_2-generation:

1- Mean squares for, genotypes, parents and F_2 crosses, were highly significant for all the traits studied except. Heading date, maturity date and straw yield per plant.

2- The most desirable remain heterosis were presented by seven crosses for maturity date, two crosses for 1000-grains weight, two crosses for straw yield per plant, three crosses for total weight of plant and one cross for grain yield per plant.

Combining ability:

F_1-generation:

1- General and specific combining ability mean squares were significant for all traits studied. GCA/SCA exceeding the were detected for all the traits studied except straw yield/plant and total weight of plant.

2- The parental lines P_4 (line 1) and P_7 (line 4) for plant height, P_4 (line 1), P_6 (line 3) and P_7 (line 4) for heading date and

maturity date expressed significant negative ($\hat{g}_i$) effects. However, P_3 (Sakha 94), P_4 (line 1) and P_5 (line 2) for number of spikes/plant, P_1 (Gemmeiza 7) and P_5 (line 2) for straw yield/plant and total weight of plant, P_1 (Gemmeiza 7), P_3 (Sakha 94) and P_4 (line 1) for grain yield per plant, P_2 (Gcmmeiza 9) and P_4 (line 1) for 1000-grains weight showed significant positive ($\hat{g}_i$) effects.

3- The parental combinations: P_1xP_2 (Gemmeiza 7 x Gemmeiza 9), P_1xP_3 (Gemmeiza 7 x Sakha 94) and P_2xP_4 (Gemmeiza 9 x line 1), for heading date, P_1xP_3 (Gemmeiza 7 x Sakha 94), P_1xP_6 (Gemmeiza 7 x line 3), P_2xP_4 (Gemmeiza 9 x line 1), P_2xP_5 (Gemmeiza 9 x line 2), P_3xP_5 (Sakha 94 x line 2), P_3xP_6 (Sakha 94 x line 3), P_4xP_7 (line 1 x line 4), P_5xP_7 (line 2 x line 4) and P_7xP_8 (line 4 x line 5) for maturity date, P_1xP_4 (Gemmeiza 7 x line 1), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_3xP_7 (Gcmmeiza 9 x line 4), P_3xP_4 (Sakha 94 x line 1), P_3xP_6 (Sakha 94 x line 3), P_4xP_7 (line 1 x line 4), P_4xP_8 (line 1 x line 5), P_5xP_6 (line 2 x line 3), P_6xP_7 (line 3 x line 4), P_3xP_8 (line 3 x line 5) and P_7xP_8 (line 4 x line 5) for number of spikes per plant, P_1xP_5 (Gemmeiza 7 x line 2), P_1xP_6 (Gemmeiza 7 x line 3), P_1xP_7 (Gemmeiza 7 x line 4), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_2xP_8 (Gemmeiza 9 x line 5), P_3xP_8 (Sakha 94 x line 5), P_4xP_5 (line 1 x line 2), P_4xP_6 (line 1 x line 3). P_6xP_8 (line 3 x line 5) for number of grains/spike, P_1xP_4 (Gemmeiza 7 x line 1), P_1xP_7 (Gemmeiza 7 x line 4), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_3xP_6 (Sakha 94 x line 3), P_4xP_6 (line 1 x line 3), P_4xP_7 (line 1 x line 4) and P_6xP_7 (line 3 x line 4) and P_7xP_8 (line 4 x line 5) for grain yield/plant,

P_1xP_4 (Gemmeiza 7 x line 1), PixP5 (Gemmeiza 7 x line 2), P_1xP_6 (Gemmeiza 7 x line 3), P_2xP_3 (Gemmeiza 9 x Sakha 94), P_2xP_8 (Gemmeiza 9 x line 5), P_3xP_6 (Sakha 94 x line 3), P_4xP_5 (line 1 x line 2), P_4xP_6 (line 1 x line 3), P_4xP_7 (line 1 x line 4) and P_7xP_8 (line 4 x line 5) for total weight of plant expressed significant desirable ($\hat{S}_{ij}$) effects.

F_2-generation:

1- GCA and SCA mean squares were found to be highly significant for all traits studied. GCA/SCA ratios were higher in magnitude in the F_2 than F_1-generation for some traits.

2- P_1 (Gemmeiza 7) expressed significant desirable ($\hat{g}_i$) effects for grain yield/plant, spike length, plant height to flag leaf, straw yield/plant, number of grains/spike, number of spikes/plant, plant height and number of spikelets/spike. While, P_3 (Sakha 94) expressed significant desirable ($\hat{g}_i$) effects for grain yield/plant, plant height, plant height to flag leaf, number of tillers/plant, and number of spikes/plant. While P_4 (line 1) expressed significant desirable ($\hat{g}_i$) effects for grain yield/plant, heading date, maturity date, number of tillers/plant and number of spikes/plant.

3- P_2xP_4 (Gemmeiza 9 x line 1), P_2xP_5 (Gemmeiza 9 x line 2), P_1xP_4 (Gemmeiza 7 x line 1) and P_3xP_8 (Sakha 94 x line 5), for heading date. P_1xP_4 (Gemmeiza 7 x line 1), P_1xP_6 (Gemmeiza 7 x line 3), P_3xP_5 (Sakha 94 x line 2), P_3xP6 (Sakha 94 x line 3), P_3xP_7 (Sakha 94 x line 4) and P_6xP_7

(line 3 x line 4) for grain yield/plant expressed significant desirable ($\hat{S}_{ij}$) effects.

Genetic components:

F_1-generation:

1- Significant values for the dominance ($\hat{H}_1$) and additive ($\hat{D}$) components were obtained for all traits studied, except for number of spikelets/spike, which insignificant ($\hat{D}$) component was obtained significant $\hat{h}^2$ values were detected for all traits studied, except for spike length and 1000-grains weight.

2- Studies on degree of dominance revealed the existence of over dominance for all traits, except for heading date, plant height to flag leaf, spike length. High to moderate heritability values were detected for all traits studied.

F_2-generation:

1- Significant additive ($\hat{D}$) and dominance components ($\hat{H}_1$) were obtained for all the traits studied, except for number of spikelets/spike.

2- The average degree of dominance showed the presence of partial dominance for all traits studied, except for, plant height, number of spikelets/spike, harvest index. Positive and negative alleles were unequally distributed in the parents for all traits studied.

3- Significant $\hat{h}$ values for all traits, except for; heading date, maturity date, straw yield/plant, total weight of plant.