VI- SUMMARY

The aim of this investigation is to study the genetic behaviour of some economic characters in squashes through an interspecific cross between Cucurbita. pepo and cucurbita. moschata. These characters included days to flowering of male and female flowers, number of both male and female flowers, Sex ratio, number of mature fruits, fruit weight, fruit length, fruit width, fruit shape index, 100 seed weight, and plant height. Cytological studies on the Karyotype for both species were also included.

Data were obtained on individual plants of both species, F_1, F_2 and the two backcrosses to both parents. Results and conclusions can be summarized as followes:

1 - Days to flowering:

Number of days from planting to anthesis of 1st flower.

(a) Male flower:

The species C. pepo was earlier in flowering than C.moschata and genetic difference was probable among the two species. Late flowering behaved as an over-dominant character. However, all kind of gene effects (additive, dominance, and interactions) were involved

in the inheritance of time to flowering. C. moschata contains preponderance of dominant alleles for late flowering. Moreover, the dominance alleles may not have the same sign. Heritability in broad sense was relatively high, and one to two pairs of effective factors were estimated among the two species for days to male flower anthesis.

(b) Female flower:

Days to anthesis of the first female flower was found to be have as a quantitative character, over-doninance for late flowering was obvious. Moreover, the additive - dominant model was not adequate to explain gene effects. However, some sort of gene interactions were involved. C.moschata, the late species seems to have preponderance of dominant alleles. The minimum number of effective factors ranged from 5 to 17 pairs among the two species. Heterosis estimates were fairly high and broad sense heritability was moderatly high.

2. Number of flowers per plant:

(a) The number of male flowers:

Genetic difference among the two species was probable for this trait. The additive-dominant model was adequate to explain gene effects. However, dominance variance was greater and more important than the additive one.

Dominance was partial, and positive heterosis values were obtained.

Both parent possessed dominant alleles. However, C. pepo mostly had some recessive alleles. The minimum number of effective factors was found to be only one pair. Heritability in broad sense was high. However, this character was likely to be affected by both genetics and environmental conditions.

(b) The number of female flowers:

The means of the number of female flowers in C.pepo had significantly exceeded that of C.moschata. Accordingly, genetic difference was probable. The mean of the F_1 was greater than that of the better parent. Therefore, high number of female flowers behaved as an overdominant trait.

Nature of gene effect is likely to be both additive and dominance. However, only one pair of genes was estimated and considered as a minimum number of effective factors.

High values of heterosis were obtained . Broad and narrow sense heritability values were high. Accordingly, the breeding value for number of female flower was high.

3. Sex ratio :

Genetic difference was obvious among the two species

since there was significant difference between the two means. Sex ratio behaved as a partial dominant trait. However, over-dominance was obtained through estimation of degree of dominance. Scaling tests indicated that the nature of gene action is likely to be both additive and dominant. Negative values of heterosis were obtained. Heritability in narrow sense was moderately high.

6. Number of mature fruits / plants :

The species C.moschata was better in fruit number than C. pepo and genetic difference was probable among the two species. Dominance was partial for this character. Moreover, the additive gene effects was found to be more important than the dominant gene effects; hence the additive genetic variance was greater than the variance which is due to dominance. The minimum number of effective factors was one pair among the two species and positive heterosis was obtained while broad sense heritability had moderatly high value.

7. Fruit weight :

Genetic difference among the two species was probable for this trait. The additive-dominant model was adequate to explain gene effects. However, the additive genetic variance was greater and consequently more important than the

width was estimated as 6 pairs of genes. High broad sense heritability values were obtained, and narrow sense heritability was about 51%. Therefore, about 49% of the phenotypic variance seemed to be due to the effect of the environmental conditions.

10. Fruit shape index:

Genetic difference was obvious among the two species since there was significant difference between the two means. Dominance gene effects was found to be more important than the additive gene effects. Moreover, some of the dominance genes seemed mostly to be recessive. Broad sense heritability was moderatly high, and heritability in narrow sense was about 23%. This may indicate that this character seems to be mostly affected by the environmental conditions. Positive values of heterosis was estimated over the mid parents. However, heterosis over the better parent was negative and only one pair of genes was estimated and considered as a minimum number of effective factors.

11. Weight of 100 seeds:

The difference between the mean of 100 seed weight was highly significant. Therefore, genetic difference was apparent between the two species. Heavy seeds showed over-dominance. Moreover, partitioning of the

phenotypic variance showed that the variance of additive gene effects was greater and more important than the dominance variance, and heterosis values were positive. Meanwhile, the estimates of inbreeding depression could be due to increasing of homozygosity in the F_2 generation. Heritability in broad or narrow sense were high, which indicated that seed weight is highly inherited character. However, it was subjected to environmental effects.

12. Plant hight:

Highly significant difference was found among the two species with respect to plant hight. Accordingly, genetic difference among the two species was probable. The present investigation showed that additive variance was greater and more important than variance due to dominance. However, dominance was incomplete. Partial dominance was also found. Both heterosis and inbreeding depression were estimated for plant hight. Heritability values in broad sense were high, However, narrow sense heritability could not be estimated.

13. Cytological Studies:

Karyotypes of C.pepo and C.moschata were described and Karyotype analysis was carried out. The somatic chromosome numbers in these species were found to be 20 and 24 respectively. Chromosomes were classified into metacentric, nearly telocentric and telocentric in term

of position of the centromeres. The chromosomes of C. pepo could be classified to: Four pairs with median centromeres, (Metacentric) . tow pairs with subtelocentric as rod shap and four pairs with telocentric. In C. moschata chromosomes were classified as following:

Sex pairs of chromosomes were metacentric. This group included two pair of chromosomes with nerly telocentric chromosomes. This category involved four pair of telocentric chromosomes. Also the Karyotypes analysis included classifing chromosome length was estimated according to the measurements of the two chromosome armsand it was found to have the range (1.2 - 4.2 mu).