

## EFFECT OF CROSSES ON TRAIT EARS OF MAIZE SUB-SPECIES CROSSES

Mohammed Dhary YOUSIF

University of Agricultural Sciences and Veterinary Medicine, 59 Marasti, District 1, 011464, Bucharest, Romania, Phone:+40735979905, Email: mdhj1965@yahoo.com

*Corresponding author:* mdhj1965@yahoo.com

### Abstract

*To investigate the effect of crosses in maize ears, five genotypes were hybridized .one genotype of each of (Z. mays L.)Sub-species (Everta, indurate, Indentata, Saccharata and the Wight endosperm Denprofeski) were intercrossed.F1 and F2 kernels and F1 ears were investigated. The results showed that hybrid vigor or dominance was controlling ears traits. They were controlled by female nuclei indicating the effect of two nuclei of female genes on one nucleus of male pollen. ,It was dominance or hybrid vigor controlling ear traits in maize*

**Key words:** Crosses of sub-species of (*Z. mays L.*)

### INTRODUCTION

#### Hybrid vigor

All [4] and [15] the first recognize this phenomenon and suggested that the last name (Heterosis) and defined as: (difference in weight, size and growth of the hybrid resulting from his parents). And means: the increase achieved in vital force, weight, size and growth in the first generation progeny (F1) compared with the best parents involved in the hybridization. Adopted [14] in his theory on the deviation of the first generation (F1) for the highest hybrid vigor parents to estimate the so the values are positive or negative .While Confirmed [10] the importance of relationship grain weight and the number of grains cob with the amount of output carbon representation processed within Confirmed individuals a single genotype. Found [3] that seed weight increases during the reproductive phase of the plant from the Florescence to physiological maturity.

Concluded [16] that the speed of growth of grain in maize is not necessarily to be in support of more owner, in other words that the category which is characterized by fast grain filling may give the holder of less than that which has a speed slower growth of the grain, on the basis of unequal of length the period of grain filling in both cases.

Either [6] has found that the hybrid vigor in maize is the bigger impact in the number of grains in the plant than in the number of cob or in the weight of grain, Because of the rapid growth of the hybrid plants and the metabolic material moves from vegetative phase to the proliferative phase faster and increase the number of grains formed and thus increasing the product of hybrid seeds, but that does not prevent of weight increase that coming from grain hybrids.

#### Length of cob in maize

Affect the length of the cob in the amount of holder through its effect on the possibility of increasing the number of grains, associated with cob length and its diameter of the growth factors significantly associated with the season the plant as well as the role of genetic [8] and [13]. Either [1] he was found that the hybrid vigor the is positive (10.7%) in the length of the cob to the highest proportion parents, while stressing [11] that all the crosses showed hybrid vigor positive the in the character of cob length was between (7.9% - 71.4%) However, some researchers found the hybrid vigor positive and negative in the search itself.

#### Cob diameters and the number of rows:

Mentioned [7] (Hatfield, et al, 1965) that the number of rows of Cob is determined by the genetic composition and growth factors, as mentioned [9] that the diameter of cob may

not give a good indication is often the product of grain due to differences in percentage proportion resulting between the weight of grain to the weight of heart cob. . Either [17] they found that the percentage of the inheritance of diameter in the strict sense of composition cob was 75% and this means it may be governed by the host gene and it may differ from time to time.

#### **Number of grains in the row in the Cob:**

Often expect to increase the number of grain product with the increase in cob length, note that this has to do with the nature and availability of growth factors during the life cycle of the plant, and concluded, [12] that the number of grains in row has a genetic influence is greater than those associated with a length of cob, That shows that the number of the class are governed by several pairs of genes, compared with fewer of them governs the length of cob. Confirmed the results [6] such a result and that per plant could give two cobs different in the number of rows.

#### **Rate of plant growth:**

Increasing or decreasing rate of plant growth depending on the nature of genotype and growth factors that is reflected on the product of dry matter per plant [2]. Measured by the rate of plant growth unit area (gm. / m<sup>2</sup> / day) or (gm. of plant / day), but the first depends on the rate of plant growth on the basis of community vegetable is the best [6], also explained that improving the rate of plant growth remains very necessary for plant breeders to increase the productivity per unit area of the total dry matter resulting from the product of the growth rate x number of days of plant growth

## **MATERIALS AND METHODS**

Prepared a piece of land in the field of Agronomy Department at the Faculty of Agriculture / University of Baghdad for the purpose of cultivation in successive seasons, spring and autumn 2010. Were ploughed and divided the ground according to the experimental units and the way genetic material used is described later.

#### **Spring season**

We do the initialize and planted the seeds of five genotypes are:

1 – (Zm2) represents the (Zea mays L. Indentata).

2 – (Zm19) represents the (Zea mays L. Indurata).

3 - (P 8) represents the (Zea mays L. Everta).

4- Hybrid U.S. (Royal Flag) represents the (Zea mays L. saccharata). Because we don't have sugar strain in this time.

5 – Type (Denbrvski) represents the white grain.

Service operations conducted for the plants until they reach the stage of hybridization and conducted reciprocal crosses were obtained for 20hybrids.

Notice:

We obtained only 18 hybridization of out of 20 because of the failure of two of the crosses. We have to encode genotypes that have been used (Zm2, Zm19, P8, Royal Flag, Denprofki) by the symbols (2, 19, P, S, Dp), respectively.

#### **Autumn season**

Planted the seeds of hybrids (20 hybrids) were planted as parents (5 parents) for comparison at the first and to get the grain F2 at the second.

Were harvested at maturity cob and dried with air to reach humidity standard. Recorded by the data for the study (cob length, cob diameter , the number of cob per plant, number of kernel per plant, number of rows in cob) and that was for both seasons, spring and autumn.

## **RESULTS AND DISCUSSIONS**

Identified five traits of each of the kernel and cob for study in this research to find out the nature of their behavior and the impact of genetic father and mother, compared with two generations F1, F2.

In the (table 1) the results of genetic crosses show the difference in the characteristics cob of the genetic structures involved in the hybridization as shown in (Table 1). But in the tables (2) seem to look first to the impact of the phenomenon (heteroses) is clear in cob length in hybridization (P x 19) gave a lower percentage of parents while already reflected (19 x P) gave the highest percentage from higher value of the parents. .

Table (1) some traits of Cob for parents and their hybrids generation (F1) in maize

parents	Average of cobs length (cm)	Average of cob diameter (cm)	Average number of rows of cob	Average of Cob number in plant	Average of Grain in plant	Average of yield of per plant
Dp	20	15	14	1,8	647	193
p	21	12	16	2,4	1436	262
s	19	14	18	1,2	582	108
19	16	16	18	1,4	621	119
2	16	14	17	1,4	450	92
♀ x ♂						
D p x S	21	18	18	1	657	214
S x DP	20	17	17	1,4	650	177
D p x P	21	16	17	2	626	220
P x Dp	17	16	13	1,2	578	148
Dpx19	14	14	14	1	605	210
P x S	18	11	16	1,2	536	185
S x P	20	15	17	1,4	673	176
P x 19	16	14	16	2,5	1575	357
19 x P	20	15	19	1	712	249
P x 2	16	11	16	2	600	139
2 x P	19	14	17	1	615	175
S x 19	22	17	15	1,2	638	211
19 x S	20	16	14	1,52	505	202
S x 2	22	15	16	1,5	1008	175
2 x S	23	15	16	1,2	487	144
19 x 2	22	17	17	1	575	187
2 x 19	22	16	16	1	555	171

As for the rest of the crosses, for example (P x Dp) the result was hybrid vigor is negative (-19%) while the already reflected (Dp x P) gave the value of the highest parent, as well as the (Dp x 19) has given the hybrid vigor is

negative by (19 x Dp) gave already reflected in rate (-30%) from higher value of the parents. This refers to the existence to overcome or the hybrid vigor from the father.

Table (2) % Hybrid vigour compared to the highest power of parents in some traits of cob in maize

♀ x ♂	Cob length	Cob diameter	Rows in Cob	Cob per plant	Grains in plant	Yield in plant
Dp x S	+5	+20	H.P	_44	H.P	+10,8
S x Dp	H.P	+13	_5,5	M.P	H.P	_8
Dp x P	H.P	+6	+6	M.P	L.P	_16
P x Dp	_19	+6	_18,7	_50	_59	_43,5
Dp x 19	_30	_12,5	L.P	_44	_6	+8,8
19 x Dp	H.P	H.P	L.P	_30	+44	+41,9
P x S	_14	_21	L.P	L.P	_62	_29,3
S x P	M.P	+7	M.P	_41,6	_53	_32,8
P x 19	L.P	M.P	L.P	H.P	+10	+36,2
19 x P	H.P	M.P	+5,5	_58	_50	_4,9
P x 2	L.P	_21	L.P	_16,6	_58	_46,9
2 x P	_9,5	HP	H.P	_58	_57	_33
S x 19	+15,7	+6	_16,6	L.P	H.P	+77
19 x S	+5	H.P	_22	L.P	_18,6	+70
S x 2	+15,7	+7	_11	+7	+72	+62
2 x S	+21	+7	_11	LP	L.P	+33
19 x 2	+37,5	+6	LP	_28,5	M.P	+57
2 x 19	+37,5	H.P	_11	_28,5	M.P	+43

### **Cob diameter**

The impact of the mother clear in this status as hybrid vigor crosses gave a negative or a positive or average between the parents because of the double dose of mother-dose compared with the father-dose.

For example, hybridization (P x S) gave the hybrid force is negative (-21%), while already reflected (S x P) gave a positive rate (7%). The Cob diameter was not reflected its impact on the number of rows, but reversed its effect on increasing the rate of weight pill note that the number of rows and number of cob per plant are the character quantity of recessive [5].

### **The number of cob per plant**

These were not such a clear inheritance because of there are several pairs of genes responsible for the low heritability of this specifications or features. That the increase in the number of specification cobs or features in plants are undesirable if not offset by an increase in the number and weight of grain. All crosses gave negative except for a hybrid vigor (Dp x P), which gave the average value of the parent. And hybridization (P x 19) were male sterile and gave the rate (2.5 Cob / plant), with a high number of grain.

Number of rows of cob and the number of grains per plant:

#### **1 - Number of rows in the cob**

Generally gave all the hybrid vigor crosses a positive or a negative or lower the average parent or parents, except hybridization (Dp x S) and (2 x P), which gave the highest value of the parent. That it confirms that this status under the impact of secondary and multiple genes and recessive, and supports what he said [7] that the number of rows in cob is determined by the genetic composition and growth factors.

Several hybrids have given the hybrid vigor between a positive or negative (-22%) and (+24%) to the highest proportion of parents indicating a large genetic difference between the parents used in hybridization, and the adoption of the emergence of hybrid power on the probability associated with the nature of the genes (polymorphic) differentiated between hybrid strains. Was the highest hybrid vigor negative (-22%) in the

hybridization (19 x S) and that points to the need to adopt a high number of strains of the rows of cob to produce a hybrid as well as such a negative inheritance.

### **2-The number of grains per plant**

This is one of the quantitative traits associated with the quantity of output. Gave hybridization (P x S) hybrid vigor is negative (-62%) and already reflected (S x P) (-53%), either hybridization (2 x 19) and already reflected (19 x 2) gave an average parents value, either hybridization (2 x S) gave the 487 grains to achieve the lowest value of the rate of parents (450 grain / plant), while already reflected gave the (2 x S) hybrid force is positive (+72%). Contrast the results in this status is the result of differences in the trait of cob for parents because it is of quantitative traits and do not determine definitively the impact of the father or mother, but due to the effect of gene pairs and the number of genes controlling the specifications or features length of the cob and the number of rows and number of cob per plant.

## **CONCLUSIONS**

Based on the results of this research, the hybrid vigor or overcome is the Governing the traits, especially cob length, number of grains and grain weight.

1-The amount of grain produced by the hybrid associated with an increased cob length and number of grains and grain weight.

2- Did not show a clear impact in the number cob per plant or the number of rows in cob.

## **ACKNOWLEDGEMENTS**

This research work was carried out with the support of University of Baghdad / college of Agriculture, Department of field crops, and Supervised by scientific Professor Dr. Elsahookie.

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