IRAQI Academic Scientific Journals
العراقية المجلات الأكاديمية العلمية
ISSN:1813-1646 (Print); 2664-0597 (Online)
*Tikrit Journal for Agricultural Sciences*
Journal Homepage: http://tujas.tu.edu.iq
TJAS Tikrit Journal for Agricultural Sciences

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**KEY WORDS:**

Heterosis, maize.

**ARTICLE HISTORY:**

**Received**: 27/08/2017

**Accepted**: 12/05/2019

**Available online:** 10/10/2019



# Heterosis of yield and its components of maize (*Zea mays* L.) using factorial mating design

## ABSTRACT

In this study, ten pure maize strains were introduced in the hybridization program according to the factorial design mating system proposed by Comstock and Robinson (1948 and 1952) and were divided into two groups: a local adapted inbred lines and strain 839 and cv 890 used as parents, (ZM51L, ZP-301, OH, IK-58, IK-8, SH, R-153) were used as females, The seeds of the ten parents and twenty-one hybrids were swon in the field of a farmer in the Zlaya area (south of Tikrit) using a random complete block design with three replicates ( RCBD ). The hybrid vigor was studied in methods (on the basis of the first generation deviation of the average and the best parents) The number of rows in per ear, the number of grains in the row, the number of grains in per ear, the weight of 300 weight and the single plant yield.

The results showed significant differences between genotypes (parents and first-generation genotypes) of all characters except the number of ears in the plant at a probability level of 1%. the hybris superior (IK-58 x local strain), (ZP-301 x 839)(IK-58 x 839), (ZM51L x C.V890) and (OH x CV 890) were based on the deviation of the average first generation from the average parents And the best parents of all characters studied.



## INTRODUCTION

Maize is an important food and industrial cereal crop in many countries of the world, including Iraq. The crop ranks third in the world after wheat and rice crops, as well as third in Iraq after wheat and barley. In spite of the great development in agriculture in most countries of the world, especially the maize crop, there is still a large hiatus in the productivity of the crop in Iraq and the world due to dependence on local and synthetic varieties Which are less productive than hybrids.

Comstock and Robinson (1948 and 1952) are a method of crossbreeding between breeds or varieties that determine the best breeds and genotypes used as parents and the best hybrids produced. AL-Falahy et al. (2012), when studying eight pure inbred lines of maize according to cross-hybridization, the heterioes was significant in: Weight of 300 weight and single plant yield. Al-Qaisi (2013), in his study of six pure strains of maize in a hybrid crossing program, showed that the hybrid heterioes showed a significant and desirable hybrid of the number of grains in the ears, the number of rows in the ears, the weight of 100 grains, the grain yield of the plant. In a study of ten pure strains of maize, al-Bayati (2013) indicated that there is a significant hybrid heterioes in the desired direction

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for the characteristics of: number of ears, number of rows in ears, number of grains per row, number of grains in ear, This study evaluates the characteristics of ten pure strains of yellow maize and the resulting hybrids according to the factorial design hybrid design.

## MATERIALS AND METHODS

10pure inbred of maize shown in Table (1) were introduced into the hybridization program according to the factorial design mating system. The inbred lines were divided into the first two groups: used as three parents (local inbred and strain 839 and cv 890) The second was used as seven females (ZM51L, ZP-301, OH, IK-58, IK-8, SH, R-153).

The ten pure in bredines were sown in the Zallaya area, about 20 km south of Tikrit, Salahddin province for the spring season on 25/3/2016. The necessary crosses were carried out between the breeds. The pollination was controlled by wrapping male and female germs with paper bags, Pohlmen (1983) mentioned that in the autumn season, the parents and their hybrids (twenty-one single hybrids and ten parents) were sown in the same site with three replicates according to the design of the complete Randomized block design and in an experimental unit comprising 3 m3, 0.75) m, and between Jorge and other (0.25) cm, superphosphate fertilizer was added (200 kg / ha) and urea fertilizer (46% nitrogen) at 200 kg / ha in two periods, the first at tillage, and the second after one month from sowing (Sepahi, 2011), the 10% Control of maize stalk borer (Sahuki, 1990). Data were recorded on the basis of single plant (10 plants of each experimental unit).

**Table (1)** Pure lines used in the study and their origin

| Line no. | Name of purs line | county |
|---|---|---|
| 1 | inbred Local acclimated | Iraq |
| 2 | strain number 839 | Iraq |
| 3 | c.v 890 | American |
| 4 | ZM51L | Yugoslavian |
| 5 | ZP-301 | Yugoslavian |
| 6 | OH | American |
| 7 | IK-58 | Hungarian |
| 8 | IK-8 | Hungarian |
| 9 | SH | American |
| 10 | R-153 | American |

The number of area/plant, the number of grains per row, the number of grains in per ear and the weight of 300 weight were calculated after weight correction on 15.5% moisture content in grains and single plant yield (g / plant).

The statistical analysis of the studied characters was carried out according to the design of the complete random sectors. The mean of the studied characters was compared with the Duncan test. Data were analyzed according to the factorial design mating system.

The strength of the hybrid was estimated on the basis of the first generation deviations from the average of the parents according to the following equation (Falconer, 1989):

$$(\mathrm{H}) = \bar{F}1 - \frac{\bar{pi} + \bar{pj}}{2}$$

As: $\overline{F_1}$ **= Average first generation.**

$\overline{pi}$ = Average First Parents.

$\overline{pj}$ = Average Second Parents.

The hybrid force was tested by calculating the value of the for each hybrid, as follows:

$$t = \frac{H}{\sqrt{V(H)}}$$

$V(H) = (3/2)\frac{\sigma^2 e}{r}$ As:

The heterioses of the hybrid on the basis of the first-generation deviation from the best parents (Sahuki et al., 1983) is as follows:

$$H = \bar{F}1 - \bar{BP}$$

As: $= \bar{F}1$ = The first generation hybrid rate.

Rate of best parents. $\bar{BP}$ =

The hybrid force was tested by calculating the value of the for each hybrid, as follows:

$$t = \frac{H}{\sqrt{V(H)}} \qquad V(H) = 2\frac{\sigma^2_e}{r}$$

## RESULTS AND DISCUSSION

The results of the tables (2 and 3) show the mean values of the parents and their hybridization of the studied characters. The Duncan multi-range test showed that the parents (10) gave a rate of (2.01) ears / plant, and differed significantly from the parents (8) ), The highest rate of the cultivar (2.13) ears / plant, and differed significantly from the hybrids (7 × 3) and (8 × 3) only. The averages ranged from 16.44 rows to 5 and 14.26 rows for a parents (9). The hybrid (5 × 3) was characterized by a rate of (17.13) rows, and the hybrid (9 × 1) gave the lowest grade of grade (12.99). The average number of grains in the row ranged from 35.30 to parents (8) (28.66) grains for the parents (6), and hybrid between (38.60) grains for the hybrid (8 × 1) and (24.17) (6 × 3), the high temperature has a direct effect on the number of grains in the row because it affected the fertilization and thus the incomplete vaccination in some hybrids involved in the experiment, while helping to Vaccination was completed in other hybrids, leading to an increase in the number of grains per row (Glow and Mohammed, 2004)

The highest number of grains in the ears (535.27) was for the parents (8), while the hybrid (5 × 1) exceeded the rest of the heterioses with an average of 607.77. The average weight of 300 grains ranged between (70.56) g for parents 10 and (58.84) g for parents 6 and for hybridization between 78.90 g for the hybrid (10 x 2) and 54.09 g for the hybrid (6 x 3). For the single plant, the parents was distinguished by the highest average of 184.12 g, while the parents gave the lowest average of 139.09 g. The hybrid was distinguished by 4 × 1, giving the highest average of 192.43 g. While the hybrid (6 × 3) gave the lowest average of (121.84) g .. Dulaimi (2009), Wahib (2012) and Hussein (2013), differences between the genotypes used in the hybridization programs.

It is clear from the above that the parents (10) may outweigh the rest of the parents for the number of per ear and the parents (8) in the number of grains in the row and the number of grains in the ears, and the parents (3 and 5) in the number of rows in the ears, The hybrid (10 × 2) was superior

to the weight of 300 grains, the hybrid (8 x 1) in the number of grains per row, and the hybrid (4 × 1) (5 × 3) in the number of grains in the ears and the number of rows in per ear, respectively.

**Table (2)** Mean performance studied characters in parents.

| genotype s | Number Of ear / plant | number of rows/ ear | number of grains / row | number of the grains/ ear | **300grains weight(gm)** | Single plant |
|---|---|---|---|---|---|---|
| 1 | 1.96 | 15.15 | 32.98 | 491.90 | 61.58 | 177.59 |
| 2 | 1.87 | 15.02 | 31.01 | 448.40 | 64.99 | 153.56 |
| 3 | 1.84 | 15.32 | 30.20 | 474.42 | 64.64 | 159.77 |
| **L.S.D 0.05** | **0.19** | **0.33** | **0.97** | **5.30** | **0.81** | **7.18** |
| **L.S.D 0.01** | **0.26** | **0.45** | **1.29** | **7.09** | **1.08** | **9.60** |
| 4 | 1.97 | 14.71 | 30.22 | 443.80 | 61.98 | 170.55 |
| 5 | 1.92 | 16.44 | 33.57 | 520.66 | 58.85 | 160.47 |
| 6 | 1.86 | 15.43 | 28.67 | 450.92 | 58.84 | 139.09 |
| 7 | 1.83 | 14.81 | 32.58 | 492.01 | 63.75 | 159.47 |
| 8 | 1.71 | 15.54 | 35.30 | 535.27 | 62.87 | 160.52 |
| 9 | 1.92 | 14.26 | 30.09 | 410.82 | 69.30 | 171.26 |
| 10 | 2.01 | 14.94 | 29.34 | 447.53 | 70.57 | 184.12 |
| **L.S.D 0.05** | **0.19** | **0.51** | **1.48** | **2.84** | **1.24** | **3.31** |
| **L.S.D 0.01** | **0.26** | **0.68** | **1.98** | **3.29** | **1.66** | **3.83** |

In light of the differences between the parents used in the study on the one hand and the differences between the resulting heterioses on the other hand, and the presence of these differences came to continue to study the genetic behavior of the characters to identify the genetic act that governs the inheritance and to reach the desired goal was conducted analysis of variance The factorial design mating design is shown in Table (3). It is noted that the parents differed significantly in the probability level of 1% for the qualities: number of grains per row, number of grains in the clove, weight of 300 tablets, single plant yield. And did not differ significantly for other qualities. The females showed significant differences in the level of probability of 1% for the studied characters except for the number of ears in the plant. There is a significant overlap at the level of 1% of the interaction between parents of the studied characters except the counting of per ear plant.

## Heterosis

The results of Table (6) show the estimated hybrid strength of the studied characters calculated on the basis of the first generation deviation from the mean of the parents. The hybrid force of the number of plant species did not reach the moral limit in both desired or undesirable directions. The number of rows in the crocodile with significant hybrid strength at the 1% probability level was significant for the number of rows in the crocodile (10 × 1), (4 × 2), (6 × 2), (10 × 2), (5 × 3) , While the hybrid (5 × 1) and (6 × 1) showed significant hybrid strength at the 5% probability level. As for the number of grains in the row, the crosses (4 × 1), 5 × 1, 6 × 1, 8 × 1, 8 × 2, 9 × 2, 10 × 2, (5 × 3) and (6 × 3) by giving them a high morale hybrid, while heterioses (5 × 2), (6 × 2) and (10 × 3) gave a significant increase at the level of probability (5%). The highest number of grains in per ear for seventeen hybrids was highest (101.45) grain for hybrid (5 x 1). Fourteen hybrids showed a significant hybrid strength at the level of the probability of 1% in the weight of 300 tablets, the highest being the hybrid (3x8) (9.798), while the hybrids (7 × 2) and (7 × 3) showed significant hybrid strength At the 5% probability level. The characteristics of the plant were characterized by a strong hybrid of five crosses (23,176) for the hybrid (5 × 1). At the 5% probability level, heterioses (4 × 1), 7 × 1 and 8 × 1 showed a positive and moral hybrid In the desired direction. A desirable hybrid force was obtained by several researchers, including Ahmed (2003), Daud et al. (2009), Ikramanullah et al. (2011) and Amiruzzaman et al. (2011). In the light of the above table (6), the two crosses (5 × 1) and (5 × 3) and the desired direction of all characteristics except the number of rows in the ears are superior, followed

by the crosses (8 × 1), 8 × 2 and 10 × 2 And 6 × 3) in four characters, either Heteriosess (4 × 1), (9 × 1), (10 × 1), (4 × 2), (5 × 2), (6 × 2) 9x2 and 10x3) were characterized by a strong hybrid of three characteristics. Thus, superior parents in hybridization programs could be used to transfer the genes of desirable characters and to benefit from superior hybrids based on the hybrid strengths because they contained the dominant genes of desired characters and obtained desired hybrid power By several researchers including Ahmed (2003), Dawood et al. (2009) and Ikramanullah et al. (2011) and Amiruzzaman Et al. (2011).

**Table (3)** Mean performance for studied in hybrids .

| Hybrid | Number Of ear / plant | number of rows/ ear | number of grains / row | number of the grains/ ear | **300grains weight(gm)** | Single plant |
|---|---|---|---|---|---|---|
| **1x4** | 2.13 | 15.67 | 26.87 | 411.87 | 60.07 | 192.43 |
| **1x5** | 2.07 | 16.60 | 37.10 | 607.77 | 57.12 | 192.21 |
| **1x6** | 1.73 | 14.37 | 34.20 | 481.48 | 61.85 | 150.80 |
| **1x7** | 1.93 | 14.40 | 30.83 | 456.57 | 62.76 | 151.13 |
| **1x8** | 1.77 | 15.93 | 38.60 | 591.90 | 59.30 | 186.10 |
| **1x9** | 2.03 | 12.90 | 33.40 | 425.20 | 68.18 | 186.85 |
| **1x10** | 2.07 | 16.20 | 29.87 | 468.50 | 61.80 | 183.64 |
| **2x4** | 1.80 | 13.43 | 31.60 | 456.87 | 56.08 | 138.79 |
| **2x5** | 1.97 | 15.60 | 34.70 | 431.48 | 64.50 | 153.71 |
| **2x6** | 1.83 | 16.77 | 27.63 | 483.43 | 60.58 | 144.63 |
| **2x7** | 1.87 | 15.27 | 33.40 | 497.28 | 66.23 | 170.10 |
| **2x8** | 1.73 | 14.93 | 36.47 | 518.11 | 55.76 | 129.24 |
| **2x9** | 1.80 | 15.47 | 27.14 | 389.60 | 72.89 | 157.15 |
| **2x10** | 2.07 | 13.67 | 26.10 | 362.03 | 78.90 | 181.26 |
| **3x4** | 1.97 | 15.03 | 32.19 | 462.67 | 69.78 | 180.41 |
| **3x5** | 1.73 | 17.13 | 28.90 | 522.73 | 54.92 | 135.49 |
| **3x6** | 2.00 | 15.17 | 24.17 | 387.83 | 54.09 | 121.84 |
| **3x7** | 1.70 | 14.77 | 33.50 | 522.17 | 62.26 | 157.18 |
| **3x8** | 1.63 | 15.77 | 30.83 | 495.80 | 73.55 | 166.21 |
| **3x9** | 1.93 | 14.40 | 29.73 | 417.67 | 66.84 | 169.78 |
| **3x10** | 1.90 | 14.97 | 32.07 | 512.07 | 71.01 | 187.45 |
| **L.S.D 0.05** | **0.34** | **0.89** | **2.56** | **3.74** | **2.15** | **4.35** |
| **L.S.D 0.01** | **0.45** | **1.19** | **3.43** | **4.33** | **2.87** | **5.03** |

**Table (4)** Mean squares for studied characters using factorial mating design .

| S.O.V | d.f | Number Of ear / plant | number of rows / ear | number of grains / rows | number of the /grains ear | 300grains weight (gm) | single yield of plant (gm) |
|---|---|---|---|---|---|---|---|
| | | | MS | | | | |
| Block | 2 | **0.048** | **3.050** | **1.622** | **645.775** | **59.896** | **610.143** |
| M | 2 | **N.S 0.088** | **N.S 0.474** | ** **43.023** | ** **10060.378** | ** **73.721** | ** **3269.496** |
| F | 6 | **N.S 0.089** | ** **4.590** | ** **54.131** | ** **18526.368** | ** **194.008** | ** **1747.464** |
| MxF | 12 | **N.S 0.044** | ** **3.505** | ** **37.645** | ** **9056.780** | ** **122.158** | ** **966.012** |
| Error | 40 | **0.043** | **0.292** | **2.408** | **72.275** | **1.690** | **132.402** |

**Table (5)** Heterosis on the base of deviation of hybrids from mid parents for studied characters .

| hybrids | ear. plant-1 | number of rows ear | number of grains/rows | number of the grains ear | **300grains weight(gm)** | single yield of plant |
|---|---|---|---|---|---|---|
| **1x4** | **0.169** | **0.735** | ****4.733-** | ****55.982-** | **1.706-** | ***18.365** |
| **1x5** | **0.125** | ***0.802** | ****3.827** | ****101.49** | ****3.097-** | ****23.176** |
| **1x6** | **0.175-** | ***0.926-** | ****3.375** | **10.340** | **1.639** | **7.545-** |
| **1x7** | **0.036** | **0.582-** | **1.947-** | ****35.383-** | **0.095** | ***17.400-** |
| **1x8** | **0.070-** | **0.585** | ****4.460** | ****78.320** | ****2.924-** | ***17.0402** |
| **1x9** | **0.091** | ****1.804-** | **1.865** | ****14.380** | ****2.735** | **12.422** |
| **1x10** | **0.080** | ****1.152** | **1.296-** | ****20.970** | ****4.280-** | **2.781** |
| **2x4** | **0.117-** | ****1.432-** | **0.988** | **10.766** | ****7.408-** | ****23.258-** |
| **2x5** | **0.072** | **0.132-** | ***2.415** | ****53.052-** | ****2.581** | **3.299-** |
| **2x6** | **0.028-** | ****1.540** | ***2.204-** | ****33.775** | **1.336-** | **1.691-** |
| **2x7** | **0.017** | **0.352** | **1.608** | ****27.080** | ***1.862** | **13.591** |
| **2x8** | **0.056-** | **0.348-** | ****3.314** | ****26.278** | ****8.169-** | ****27.795-** |
| **2x9** | **0.094-** | **0.829** | ****3.411-** | ****40.014-** | ****5.744** | **5.262-** |
| **2x10** | **0.128** | ****1.315-** | ****4.075-** | ****85.934-** | ****11.11-** | **12.426** |
| **3x4** | **0.064** | **0.018** | **1.978** | **3.558** | ****6.474** | **15.255** |
| **3x5** | **0.147-** | ****1.252** | ****2.986-** | ****25.189** | ****6.820-** | ****24.631-** |
| **3x6** | **0.153** | **0.210-** | ****5.261-** | ****74.833-** | ****7.644-** | ****27.587-** |
| **3x7** | **0.136-** | **0.298-** | **2.114** | ****38.955** | ***1.936-** | **2.442-** |
| **3x8** | **0.141-** | **0.335** | **1.916-** | **9.045-** | ****9.798** | **6.071** |
| **3x9** | **0.053** | **0.387-** | **0.411-** | ****24.953-** | **0.132-** | **4.271** |
| **3x10** | **0.025-** | **0.165-** | ***2.295** | ****51.097** | ****3.406** | **15.510** |
| SE(H) | **0.14** | **0.38** | **1.09** | **6.01** | **0.91** | **8.13** |

The results of table (6) show the ratio of the force of the hybrid on the basis of the first generation deviation from the best parents of the studied characters.

Hybrid strength of the number of granules in the plant None of the hybrids showed significant hybrid strength in both positive and negative directions. As for the number of rows in the ears, heterioses (9 × 1), (4 × 2), (10 × 2), showed significant hybrid strength at the 1% probability level, while heterioses (6 × 1), (10 × 1) (9 × 3) significant hybrid strength at the 5% probability level. The hybrid strength was significantly increased at a 1% probability level for the number of grains per row in seven crosses (3.540) for the hybrid (5 × 1) while the hybrids (8 × 1) and 10 × 1 gave the desired and Fifteen hybrids have significant hybrid strength at 1% and one hybrid at a 5% probability level for the number of grains in the clove. For the weight of 300 tablets, the hybrid force was desirable and significant at the level of 1% to 12 hybrid (8.560) for the hybrid (8 × 3), while the hybrids (7 × 3) and (9 × 3) showed a significant hybrid at a tolerance level 5%. The hybrid (6 × 1), (7 × 1), (4 × 2), (8 × 2) and (6 × 3) showed a significant hybrid at 1% (Positive and moral hybridization at a 5% probability level. Several researchers reported similar results, including Shabak et al. 2011) and al-Hamdani (2012) and al-Janabi (2014).

In the light of the above, with regard to the superior heterioses and more than the characteristics calculated on the basis of deviation on the best parents, we note the superiority of heterioses (10 × 1) and (10 × 2) and (6 × 3) and the desired direction of four characteristics, followed by heterioses (5 × 1) (8 × 1), (4 × 2), (8 × 2), (9 × 2), (5 × 3), (8 × 3) and (9 × 3) The hybrids (4 × 1), (6 × 1), (9 × 1), (6 × 2) and (7 × 3) were characterized by the strength of hybrid hybrids. Desirable for qualities that excelled and the use of this hybrid in commercial production. From the above, we note that heterioses (5 × 1), (8 × 1), (10 × 1), (8 × 2), (10 × 2), (5 × 3) and (6 × 3) These are agreed with Ahmad (2003), Rezaei et al. (2004), Ikramanullah et al (2011), EL-Shamarka et al. (2015), which are superior to parents and best parents for most studied characters.

**Table (6)** Heterobeltosis of the hybrids for studies characters.

| genotypes | ear. plant-1 | number of rows ear | number of grains | number of the grains ear | **300grains weight(gm)** | grain yield of plant |
|---|---|---|---|---|---|---|
| **1x4** | **0.171** | **0.348** | ****6.114-** | ****80.030-** | **1.895-** | **14.845** |
| **1x5** | **0.105** | **0.160** | ****3.540** | ****87.107** | ****4.463-** | **14.617** |
| **1x6** | **0.229-** | ***1.063-** | **1.219** | **10.417-** | **0.272** | ****26.794-** |
| **1x7** | **0.029-** | **0.750-** | **2.148-** | ****35.330-** | **0.989-** | ****26.457-** |
| **1x8** | **0.195-** | **0.393** | ***3.300** | ****56.630** | ****3.565-** | **8.506** |
| **1x9** | **0.071** | ****2.25-** | **0.419** | ****66.697-** | **1.122-** | **9.258** |
| **1x10** | **0.056** | ***1.050** | ***3.114-** | ****23.397-** | ****8.765-** | **0.474-** |
| **2x4** | **0.162-** | ****1.577-** | **0.600** | **8.467** | ****8.915-** | ****31.747-** |
| **2x5** | **0.005** | **0.840-** | **1.140** | ****89.173-** | **0.492-** | **6.747-** |
| **2x6** | **0.129-** | **1.337** | **3.373-** | ****32.523** | ****4.411-** | **8.919-** |
| **2x7** | **0.095-** | **0.257** | **0.830** | **5.277** | **1.241** | **10.635** |
| **2x8** | **0.229-** | **0.607-** | **1.167** | ***17.157-** | ****9.229-** | ****31.269-** |
| **2x9** | **0.162-** | **0.457** | ****3.868-** | ****58.803-** | ****3.591** | **14.104-** |
| **2x10** | **0.056** | ****1.343-** | ****4.905-** | ****86.367-** | ****8.339** | **2.847-** |
| **3x4** | **0.005** | **0.277-** | **1.977** | **11.473-** | ****4.788** | **9.871** |
| **3x5** | **0.229-** | **0.693** | ****4.663-** | **2.077** | ****10.07-** | ***25.274-** |
| **3x6** | **0.038** | **0.263-** | ****7.017-** | ****86.577-** | ****10.89-** | ****37.919-** |
| **3x7** | **0.262-** | **0.543-** | **0.933** | ****30.161** | ***2.735-** | **2.582-** |
| **3x8** | **0.329-** | **0.227** | ****4.467-** | ****39.470-** | ****8.560** | **5.702** |
| **3x9** | **0.029-** | ***0.910-** | **0.457-** | ****56.743-** | ***2.464-** | **1.466-** |
| **3x10** | **0.111-** | **0.343-** | **0.877** | ****37.657** | **0.447** | **3.342** |
| SE(H) | **0.16** | **0.44** | **1.26** | **6.94** | **1.06** | **9.39** |

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## قوة الهجين لصفات الحاصل ومكوناته في الذرة الصفراء (*Zea mays* L.) باستعمال النظام التزاوجي العاملي

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**المستخلص**

استخدمت في هذه الدراسة عشر سلالات نقية من الذرة الصفراء أدخلت في برنامج التهجينات وفق النظام التزاوج العاملي المقترح من قبل كل من Comstock و Robinson (1948و1952) وقسمت الى مجموعتين الأولى وهي (سلالة محلية متأقلمة و سلالة رقم 839 و890 c.v ) استخدمت بوصفها اباء، والثانية وهي (ZM51L ، ZP-301 ، OH، IK-58، IK-8، SH، R-153 ) استخدمت بوصفها أمهات، زرعت بذور الإباء العشرة واحدى وعشرين هجينا ناتجا عنها في حقل احد المزارعين بمنطقة الزلاية (شمال تكريت ) باستخدام تصميم القطاعات العشوائية الكاملة R.C.B.D بثلاث مكررات وتمت دراسة قوه الهجين بطريقتين (على أساس انحراف متوسط الجيل الأول عن متوسط الابوين وافضلهما)، درست الصفات : عدد العرانيص بالنبات وعدد الصفوف بالعرنوص وعدد الحبوب بالصف وعدد الحبوب بالعرنوص ووزن 300 حبة وحاصل النبات الفردي .أظهرت النتائج وجود اختلافات عالية المعنوية بين التراكيب الوراثية (الآباء وهجائن الجيل الأول ) لجميع الصفات باستثناء عدد العرانيص بالنبات عند مستوى احتمال (1 %). تفوقت الهجن (IK-58 x سلالة محلية) و ( 839 x ZP-301 ) و (839 x IK-58 ) و (C.V890 x ZM51L ) و ( C.V 890 x OH ) على أساس انحراف متوسط الجيل الأول عن متوسط الأبوين وأفضل الأبوين لجميع الصفات المدروسة .

**الكلمات المفتاحية:** قوة الهجين، الذرة الصفراء.