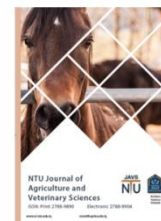




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Estimate of General and Specific Combining Ability for Double Hybrids of Corn(*Zea mays* L.)

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A B S T R A C T

Six inbred lines of maize (1) H, (2) A, (3) I, (4) T, (5) E, (6) M, obtain (45) double hybrids result from (15) single hybrids. The seeds of Double hybrids were sown in experiments comparison using randomized completely block design (RCBD) in three replication in the field of technical agricultural college It was conducted during 2021 autumn to estimate general and specific combining ability parents and double hybrids to study traits like (number of days to silking and tasselling, plant height, ear diameter and length, number of rows per ear, number of grains per ear, 300 grain weight, yield per plant. depended comparison Analysis of variances for double hybrids were differ significantly at 1% for all studied traits. Result from comparison analysis variances double hybrids showed presence effects additive genetic and non additive genetic effects for all traits. The inbreed (A) effects desirable of general combining ability for all characters. Followed by inbreed (I) which showed desirable general effects for all characters except height plant. The performance of double hybrid was good for all characters of interaction in arrangement (ij) (kl) and then could be used in future breeding programs



Introduction

Consider *Zea mays* of the most important food and industrial cereal crops in many regions of the world, This crop ranked third in the world after wheat and rice in area planted and production, but in a lot of countries are still corn production which is very low as a result of its dependence on common local species and varieties of synthetic and where the service is adequate for the soil and crop, So it has become necessary to produce hybrids of various kinds to increase the productivity per unit area and Cheek up hybrids which is characterized by the qualities productivity and good quality, rather than the use of synthetic varieties. Sugeest [1] used Single Hybrids and the resulting abundance of Hybrid vigor and then used on a commercial scale, followed three hybrids and Double hybrids .Which is better from Single Hybrids adaptability and environmental conditions as well as resistance to disease, insects and stable be better,Many seeds' companies use heterosis significantly in maize [2], and hybrid doubles is a hybridization Diallel to hybridize the first generation with no parent repeat twice in the same hybrid.[3] when assessing double hybrids resulting from Single hybrids Spanish and Australian input in growth and productivity with the comparison class controle (rabee), increasing double hybrids (143 × cosSansa) and (143 × FIR) and (276 × cosSansa) in several qualities which holds the grain and weight of 500 tablets in the spring season, and in the autumn season, increase in double hybrids (27 × FIR) and (276 × FIR) and (276 × CosSansa) on the class of comparison in the recipe holds grain while the superiority of hybrid doubles (143 × FIR) in recipes early flowering male and female and Ornfaa plant and number of grains in a row. Found [4] when predicting Bhasal 630 my husband the resulting elected from individual camel hybrid when used for ten pure strains of maize that ranged from (91.52 g / plant) doubles hybrid] (83- CML) × (141- CML) [×] (31 - CML) × (117- CML) [and (142.88 g / plant) doubles hybrid] (3 -2-S4 -601 - CML) × (107 × CML) [×] (83 -CML) × (POP43-C5-HC-B8-2-1) [hit (120.26 g / plant) for class comparison. [5] was found when compared to the ten hybrids married with two local significant differences in the spring season as (G97×SC25)×(CzH5×WH1){ } (DK31×ZAM12)×(CAP34×CzH12){ } (WH3×C2H16)×(CZH17×CZ) { In early flowering male as it took 50 days for up to 50% flowering male while Class (106) Research compositions more delays as took (60.6) as well as the days Obakrt same camel marital above add hybrid (CZH16 × ZAM34) × (CAP34 × DKC80) flowering feminine and lasted 53 days while reached (63.3) days in the category (106) Research. Found [6] study of seventeen hybrid my husband and there were no significant differences for

prescriptions weight of 1000 grains and the number of rows and number of grain grade and length of Aernos and winning. Found [7] in the study of the inheritance of winning and its components and quality traits in the hybrids odd and even maize that the source of the difference 1. Line General, which is evidence of the impact of additional genes and the influence of the interference of extra type was significant at the level of probability of 1% of all the recipes except recipe ear diameter which was significant at the level of 5% probability, the sources 2.Line Specific and 2. Line Arrangement which evidence of a dominate effect of genes and addetive of this kind were significant at the possibility of 1% of the traits, all except for the number of days to flowering feminine and plant height and number of rows in ear where it was significant at the level of 5% probability.

The study aims to evaluate the performance of Double Hybrids and estimate the genetic effects additional and additive and epistasis , which controls the different traits of the field by estimating the general combination ability and specific combination ability of double hybrids determine the breeding method best

Materials and Methods

Entered the six pure strains of maize 1) H, (2) A, (3) I, (4) T, (5) E, (6) M in the hybridization program interactively halves by way [8] II-model for 15 Single cross, and which was to get (45) My double hybrids. Seed swing double hybrids using randomized complete block design (R.C.B.D) with three replications in the technical agricultural college field -during season autumn 2022.included experimental tow lines for each hybrid, length lines 5m and the distance between lines 0.75 m and 0.25 space between seeds . Agriculture carried out after cultivars the soil and and divided as recommended. Use super fertilizer phosphate triple P_2O_5 as a source of phosphorus by 50 kg / 2500m² Added full complete in cultivars , and use of urea (46% nitrogen) as a source of nitrogen rate of 100 kg / 2500m², it was added to the first two in agriculture, the second month after agriculture. Use granular insecticide diazinon 10% (Sesamia criseca), after the first 20-25 days from sowing and the second two weeks after the first control. end of the season when the maturity of the plants were five selected plants of each experimental for study traits (the number of days flowering male , female plant height , diameter , length ear and number of rows ,grain in Aernos , weight 300 grain and harvest yield single plant) Statistical analysis was performed for double hybrids using the above design and has a comparison between the averages of genotypes using the least significant difference (LSD) test at a level of probability of 5% and 1%

and held the of analysis by method proposed by [9] to GCA and SCA as follows

1. The effect of interaction strains i and j appear together, regardless of the order
- 2- effect of interaction three strains i and j and k appear together regardless of the arrangement and 3-four strains i and interaction j k and L effect regardless of the arrangement.

Crossings between single hybrids to obtain double hybrids

| | 1 2 | 1 3 | 1 4 | 1 5 | 1 6 | 2 3 | 2 4 | 2 5 | 2 6 | 3 4 | 3 5 | 3 6 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5 6 | X | X | X | | | X | X | | | X | | |
| 4 6 | X | X | | X | | X | | X | | | X | |
| 4 5 | X | X | | | X | X | | | X | | | X |
| 3 6 | X | | X | X | | | X | X | | | | |
| 3 5 | X | | X | | X | | X | | X | | | |
| 3 4 | X | | | X | X | | | X | X | | | |
| 2 6 | | X | X | X | | | | | | | | |
| 2 5 | | X | X | | X | | | | | | | |
| 2 4 | | X | | X | X | | | | | | | |
| 2 3 | | | X | X | X | | | | | | | |

Results and discussion

The table shows (1) the effects of the general combination ability for pure line of studied were pure line showed (A) desirable effects of the GCA of all the traits of the highest value for the number of grains in ear and least in the along aer value (18.82 and 0014) on the respectively, followed by strain (i), which showed GCA of all the traits except recipe plant height while showing strains (H, B, T, M) desirable effects, 2,3,7,7 of traits respectively these results indicate the effect of the genetic reaction additive and suitable method of breeding is the selection and the possibility of depended parents special for GCA for the largest traits in breeding programs to improve yield. The desired effects of the general ability to combine are due to the additional genetic action of the introduced strains, such as the parents of (10), and thus these strains can be used to improve these characteristics in which they were distinguished through programs of individual hybrids [11] and [12] and [13] revealed the presence of a number of strains that showed a significant and desirable manner for the characteristics regardless of the arrangement toward the traits with the results of bilateral interactions dynasties to the Sort By respectively S (ij) (--) and S (i-) (j-)there

are clear differences in the Specific combination ability effects and this indicates the importance of the order of pure strains in Double hybrids to get the good behavior of pure strains. the order S (ij) (- -), all interaction pure strains gave desirable SCA of this kind for all of the traits, the basis of arrangements the order S (i-) (j-) gave all overlaps pure desirable SCA of this kind of conduct for all of the traits of the strains. The S (ij) (--) and S (i-) (j-) arrangements of the strains gave a desirable behavior for the special ability (GCS) in all traits. This is consistent with [12] .

We conclude from the foregoing that the pure strain (A) special desirable for GCA, the effects of all the traits followed by pure strain (I) which showed the general effects of desirable traits, except the status of high plant, And think about future breeding programs better than overlapping shows in the emergence of some of the arrangement.

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Table 1. the effects of (GCA) for parents of the traits in maize effects of all traits. When comparing the behavior of bilateral interactions strains

| Genotype | Traits | | | | | | | | |
|----------|---------------------|---------------------|---------------------------|------------------------|------------|--------------|--------------|------------------------|----------------------|
| | Yield per plant g)(| Weight of 300 seeds | number of grains in a cob | number of lines in cob | Length cob | Diameter cob | Plant height | Number of days tasling | Number of days silks |
| H | 7.13 | 1.31 | 16.97 | 0.20 | 0.36 | 0.026 | 1.40 | - 0.66 | - 0.67 |
| A | 0.05 | 0.22 | 18.82 | 0.26 | 0.01 | 0.024 | 2.54 | 0.66 | 0.08 |
| I | 2.34 | 0.08 | 2.35 | 0.08 | 0.06 | 0.017 | - 1.53 | 0.00 | 0.04 |
| T | - 5.50 | - 1.53 | - 0.93 | 0.08 | - 0.23 | - 0.006 | - 0.81 | 0.07 | 0.05 |
| E | - 6.26 | - 0.32 | - 29.38 | 0.57- | - 0.26 | - 0.07 | - 0.91 | 0.13 | 0.10 |
| M | 2.23 | 0.14 | - 3.93 | 0.27- | 0.14 | 0.003 | 0.30 | 0.38 | 0.38 |

Table 2. the effect of overlap of two strains (i) and (j) appear together regardless of the arrangement of the studied traits in maize.

| Genotypes | characters | | | | | | | | |
|-----------|---------------------------|-----------------------------|--------------------|-------------------|-------------------|-----------------|------------------|----------------------|------------------------|
| | No.days of male flowering | No.days of female flowering | Plant height (cm.) | Ear diamrte (cm.) | Earl length (cm.) | No.of rows /ear | No.of grains/ear | Weight 300 seed(gm.) | Individual plant yield |
| S2(12) | 14,4- | 15,4- | 42,6- | 1,03- | 4,11- | 3,9- | 142,50- | 15,15- | 25,2- |
| S2(13) | 14,3- | 15,4- | 43,1- | 1,03- | 4,42- | 4,1- | 153,07- | 14,86- | 28,0- |
| S2(14) | 14,4- | 15,4- | 41,4- | 1,01- | 4,02- | 4,1- | 150,73- | 13,87- | 26,7- |
| S2(15) | 14,4- | 15,4- | 42,5- | 1,01- | 4,17- | 4,1- | 149,52- | 14,33- | 27,3- |
| S2(16) | 14,3- | 15,1- | 41,5- | 0,99- | 4,19- | 3,9- | 144,35- | 14,07- | 25,6- |
| S2(23) | 14,4- | 15,4- | 42,1- | 1,00- | 4,05- | 4,1- | 146,51- | 13,7- | 25,6- |
| S2(24) | 14,4- | 15,4- | 41,7- | 1,00- | 4,18- | 4,4- | 141,01- | 13,89- | 24,8- |
| S2(25) | 14,4- | 15,5- | 41,6- | 1,01- | 4,26- | 4,0- | 150,93- | 14,68- | 27,1- |
| S2(26) | 14,4- | 15,5- | 43,4- | 1,03- | 4,21- | 4,1- | 159,90- | 14,62- | 28,3- |
| S2(34) | 14,4- | 15,4- | 42,0- | 1,03- | 4,27- | 4,0- | 152,81- | 14,93- | 27,1- |
| S2(35) | 14,4- | 15,5- | 41,7- | 1,00- | 3,99- | 3,9- | 141,16- | 14,06- | 24,7- |
| S2(36) | 14,5- | 15,5- | 41,5- | 1,01- | 4,10- | 4,0- | 143,20- | 14,43- | 26,0- |
| S2(45) | 14,4- | 15,4- | 42,7- | 1,01- | 4,12- | 4,0- | 145,05- | 14,41- | 24,8- |
| S2(46) | 14,5- | 15,5- | 42,8- | 1,02- | 4,16- | 4,0- | 146,323- | 14,47- | 26,2- |
| S2(56) | 14,4- | 15,4- | 41,8- | 1,01- | 4,19- | 3,9- | 141,39- | 14,39- | 25,5- |