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Estimation GCA and SCA, Hybrid Potency, Protein Gene Action and Grain Yield for Two Generations of Bread Wheat Grains (*Triticum Aestivum*. L)

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ABSTRACT

Study of GCA, CSA and genetic hybrids of wheat grain quality traits (*Triticum aestivum* L.), Adana, Goz, 2 July, Site Mall, Research 22, Rashid, Milano, Sham 6, Aba 99. and Abu Ghraib. Half hybridization to obtain (45) hybrids. These hybrids were grown with my knowledge using the RCBD design for the first generation 2018 and 2019 and the second generation 2019 and are suitable for the characteristics (good plant yield and protein content). The method and method of camels and fathers against groups of camels and fathers plus camels was significant at the (1%) level for recovery, while the method of sweeping on camels was not significant for the characteristic that enables it to work. The 2019 generation for the protein percentage and the first generation 2019 for the average total protein percentage in the other generations for the protein percentage and that the ratio of components between the estimators was less than intelligent for the plant productivity characteristic and for all generations, the first generation 2018 for the protein percentage and the next generation 2019 the first alternative 2019 for the protein percentage and the first generation 2019 for the protein percentage. The first 2018 for the protein percentage and the first generation 2019 The next 2019 The first alternative 2019 for the protein percentage and the first generation 2019 This is important for additional and non-additional effects. 4 and 7 are superior. Hybrids (1x8), (6x9) have their own general ability to achieve maximum accuracy.

Keywords: GCA, SCA, Hybrid, wheat, Quality.

Introduction

Bread wheat (*Triticum aestivum* L.) is one of the most important strategic crops and the most cultivated in terms of area. The importance of this crop is due to the fact that it has a high nutritional content for humans, which is used in the production of the best types of bread and pastries. It contains 7-17 proteins, the percentage of protein more than 12 and 2-3 and some other mineral elements. The protein content of wheat grains is of great importance for the flour characteristics, as it contains wet gluten between 30-35%, which contains protein substances consisting of Gliadin and Glutinin, and the importance of elasticity and size of bread and pastries (Amiri and et al, 2018). Breeding programs synchronized with increased grain yield. The introduction of genotypes in a group of reciprocal crosses is one of the important methods that plant breeders consider in extra to it is one of the approved methods to reach the nature of the genetic action and the general and private general capabilities, which in turn give a set of conclusions to know which of the breeding methods are suitable for the circulation of these clans in subsequent generations (AL Zubaidi, and, et al, 2023), and in that, obtaining new general, it is possible to take advantage of the phenomenon of hybrid strength and the two general and private general capabilities of parents and hybrids resulting from the specific characteristics under study. In a study of the protein ratio, (Arash, et al,2021) found that the grain yield trait is under the influence of the additional genetic action. (Javed and et al,2015) concluded in their study of the components of the outcome that the additional genetic action was more influential to the yield trait. (Abd El-Mohsen, et al,2015) also found that the two capacities are The two federations were not significant in protein percentage, as (Assoc,2013) explained that the characteristics of grain yield and the ratios of protein and protein fall under the influence of additional genetic action.(Graziano,2019) indicated that the ratios of protein and gluten were high and significant in the first generation, and high for gluten in the first and second generations. A study of two generations of bread wheat, so(Nie et al,2019) explained in their study of reciprocal crosses of fine wheat that the mean squares of the two federal values of general and special were not significant in protein percentage and that their percentage was less than the correct one. The study also aims to evaluate the performance of ten genotypes of wheat (Li, et al.2013) Bread and its semi-reciprocal hybrids in order to assess the effects of the general and specific capacity, the strength of the hybrid for the individual plant yield, and some qualitative characteristics to determine the best breeding methods and improve the bread wheat population.

Materials and Methods

Half cross crosses of ten genotypes of bread wheat (*Triticum aestivum* L.) for the 2016-2019 seasons in eastern Diyala province, which were obtained from the Research Center in season 2016, were planted with ten genotypes (parents). Single hybrids were planted according to the second Griffing method (1956), where parents were planted with crossbreeds in mid-November 2017 using an RCBD design with three replications. Each duplicate contained 55 lines of 2 m length and the distance between one line and another is 60 cm. Each line has 20 with a distance between and another 10 cm, after choosing them randomly. Superphosphate fertilizer was added at a rate of 320 kg. ha-(P2O5), and urea fertilizer (% N46) was added at the branching stage, and in the second season 2017_2018, the parents and the first generation hybrids were planted to obtain the second generation in mid-November using the RCBD design with three and the distances the same as what was mentioned in the first generation, and all agricultural operations were performed as in the previous season, and the amounts of fertilizers were added as mentioned in the first season. For both generations, all the data were recorded, and in the 2018-2019 season all the parents and their hybrids were planted for the first generation 2018 and 2019 and the second generation 2019 to estimate (individual plant yield and protein percentage). All data were analyzed for the first generation 2018 and 2019 and the second generation 2019 and the synthesis, then part The mean of its squares to the general and private federal estimates using the second Griffing method of the random model, Griffing, (1956). Here, the effect of the variations of the general and private general estimates for all generations is estimated by in addition to the combination analysis, the strength of the two hybrids was estimated on the basis of the deviation of the first generation from the average parents and the best of them for all generations. The arithmetic averages were compared at (1%) and (5%) probability levels.

Results

Single plant

It is evident from the table of analysis of variance for the characteristic of plant yield Vegetation, Table 1, that there are statistically significant differences in this characteristic for all generations, and the combination analysis, parents, and hybrids, while the parents against hybrids did not show significant differences in all generations and the meta-analysis, and from the same table it was found that the variance The general and special general capabilities were significant at the probability level (1%) for all generations except for the first generation 2019 of the general ability was significant at the probability level (5%), and that the ratio between the values of the two variance components was less than the correct one for all generations. The significance of both the variance of the general and private general ability indicates that the additional and non-restrictive effects of the genes that control the quality of the individual plant yield, and that its percentage value is less than the correct one. This means that the sovereign variance is the most controlling of his inheriting this trait.

Table 2 for the first generation 2018 shows the performance of the effect of the two abilities, and from the average of the parents it was noted that the Father 4 was significantly superior to the other parents for this trait, which reached 61,06 g. Vegetation, while the lowest for this trait was the parent 7, which was 31,12 g. The superiority of Father 1 was observed significantly at the level of probability (1%) and in the desired direction at the level of probability (1%) and positive in significance in the desired direction at the level of probability (5%) for parent 9, whose values were 3.109 g. And the difference values of the effect of their special general ability were 6070.075 and 384.324 respectively, and this indicates that parent 1 transferred the effect of his genes to part of his crosses without the other, while parent 9 transferred the effect of his genes to most hybrids on a regular basis. From the same table for the first generation 2019 of the average parents, we find that the Father 4 outperformed the other parents of this trait by 59,73 g. Vegetable, while the lowest average of 7 for this trait was 37,787 g. As for the effect of the general ability of this generation on it, it is noticed that there are significant differences at the level of probability (5%) for Father 4 and in the desired direction, and that the highest parents in the effect of their general ability were for parents 4 and 9, which amounted to 2.73 and 2,133 respectively, and the difference values of the effect of their special general ability amounted to 537,238 And 307.067, respectively, and their values are the median of the variations of the effect of the special federal ability of the parents, which means that they distribute the genes that control the trait for most of their hybrids, but in the meta-analysis and from the average of the parents, the parent 4 was significantly superior to the other parents, it reached 60.396 g. 7 It reached 34,453 gm. Vegetation, the effect of the general ability was significant in the desired direction at a probability level (5%) for Lap 9, and this confirms the possession of parent 9 in the first generation assessment for the year 2018 and 4 and 9 in the first generation assessment for the year 2019, a latent ability in increase the grain yield of the plant when they enter the crosses, and that Father 9 was stable in possessing this ability as he excelled in the two seasons and aggregation, which is recommended to be included in breeding and crossbreeding programs to increase and improve this trait in misc for the wheat These results were similar to his findings Zörb, et al,(2017) also had the same results were with Friedli,(2018).

The results of Table 3 show the performance of camels and the effect of the general special capacity for the 2018 generation. From the average of the hybrids, it is noticed that the hybrid (1 × 2) outperformed other hybrids, which reached 64.46 g. [1], and the effect of the federal ability for this trait was positive in the desired direction at a probability level (1%) for (1 × 2), (1 × 8), (1 × 10) 6 × 9) and (7 × 8) and (7 × 9) and a positive significant positive in the desired direction at a probability level (5%) in (2 × 9), (3 × 7) and (3 × 8) hybrids. As for the strength of the hybrid over the average of the two parents, it was positive at the probability level (1). %) And in the desired direction in hybrids (1 × 2), (1 × 8), (1 × 10), (2 × 6), (2 × 7), (2 × 8), (2 × 9) and (3) (6 ×), (3 × 8), (3 × 9), (5 × 8), (6 × 8), (6 × 9), (6 × 10), (7 × 8) and (7 × 9)) And (8 × 9) and a positive significant in the desired direction at a probability level of (5%) in (1 × 6), (5 × 7) and (6 × 7) hybrids, and for the strength of the hybrid over the best parents, a positive significance is observed at the level of probability (1%) and in the desired direction in the hybrid (1 × 2), (1 × 8), (1 × 10), (2 × 6), (2 × 7), (2 × 8), (2 × 9) and (3 × 8), (3 × 9), (6 × 8), (6 × 9), (7 × 8) and (7 × 9).

As for the first generation (2019) and from the average, it was noticed that the superiority of camels (4 × 5) was the highest for this trait was 59,287 g, while the lowest hybrids for this trait (4 × 6) reached 34,017 g, and from the effect of the special general ability it is noticed the presence of positive morale in the desired direction At a probability level of (1%) in hybrids (3 × 7), (4 × 10) and (8 × 9), and for the strength of the hybrid over the mean of the parents, it was found that there is a positive significant hybrid force in the desired direction at a probability level (1%) in hybrids. (1 × 8), (1 × 10), (2 × 6), (2 × 7), (2 × 8), (2 × 9), (3 × 6), (3 × 7) and (3 × 8), (3 × 9), (3 × 10), (4 × 8), (4 × 10), (6 × 9), (6 × 10), (7 × 8) and (7 × 9) And (8 × 9) and (9 × 10), and positive significant in the desired direction at a probability level (5%) in hybrids (6 × 8).As for the strength of the hybrid over the best parents, it was significant in the desired direction at the probability level (1%) in (2 × 7), (2 × 8), (2 × 9), (3 × 6), (3 × 7), (3 × 8), (3 × 9), (3 × 10) and ((6 × 9), (7 × 8), (7 × 8), (7 × 9), (8 × 9), and (9 × 10). For this trait, it was 55,896 g. Vegetation, and the lowest for this trait (4 × 6) was 34,016 g. Vegetation, and the effect of the general Special Estimator was moral. A positive state in the desired direction at a probability level of (5%) in (1 × 2), (1 × 8), (1 × 10), (3 × 7), (6 × 9) and (7 × 8) hybrids, while The strength of the hybrid over the average of the two parents was positive in the desired direction at a probability level of (1%) in the crosses (1 × 2), (1 × 8), (1 × 10), (2 × 7), (2 × 9) and (3 × 7), (3 × 8), (6 × 9), (7 × 8), (7 × 9), (8 × 9) and (9 × 10), and a significant positive in the desired direction at a probability level of (5%). (In camels (3 × 6), (3 × 9) and (6 × 8), it is noted that the camels (1 × 2), (1 × 8), (1 × 10), (6 × 9) and (7) × 8) and (7 × 9), the strength of the hybrid and the two cohorts were significant in the first generation of the 2018 and aggregate season, as a deviation from the mean of the parents. And hybrids (3 × 7) and (8 × 9) in the first generation 2019, and at the same time these hybrids had significant effects and in the same direction to the effects of special ability, so it is possible to recommend breeding with hybrid strength in these hybrids. From the average hybrids for the second generation 2019, it is noticed that the hybrid (4 × 10) is superior to the rest of the hybrids for this trait, which reached 59,287 g, and the lowest for this characteristic (4 × 6) was 34,017 g. Desirable at a probability level of (1%) in (1 × 2), (1 × 8), (3 × 8) and (8 × 9), and a significant positive in the desired direction at a probability level (5%) in (2 × 9) hybrids. And

(3 × 6), (4 × 8) and (6 × 9), as for the hybrid strength over the average of the parents, it is noticed that there is a positive morale in the desired direction at the probability level (1%) in the (1 × 8) and (2) hybrids (× 9), (3 × 6), (3 × 7), (3 × 8), (3 × 9), (3 × 10), (4 × 10), (6 × 8), (6 × 9)) And (6 × 10), (7 × 10), (8 × 9), (8 × 10) and (9 × 10), and the strength of the hybrid for the best parents was positive in the desired direction at the probability level of (1%) in Hybrids (3 × 6), (3 × 8), (3 × 10), (6 × 8), (6 × 10), 8 × 9), (8 × 10) and (9 × 10), and it is noted that the two hybrids (6 × 9) and (1 × 8) had positive Moral effects for the general special ability and had a Moral hybrid force in the two concepts in the first generation of the two seasons and the second generation, and this results from the presence of a dispersion of alleles. For you hybrids that showed significant hybrid strength only in the second generation without having high hybrid strength in the first generation, this is a result of the fixed effects of the genes controlling the trait. As for those that were high in the first generation and did not decrease significantly in the second generation, the additional influence of the genes would control the inheritance of this trait, while if the hybrid strength was high in the first generation and deteriorated greatly in the second generation, then the dominance effect of genes is clear in its performance on the trait. This is in line with findings by Saud and et al, 2018).

Table 4 shows that all genotypes, parents, hybrids and for all generations were significant at a probability level (1%) for parents versus hybrids. It was significant at a probability level (1%) in the first generation 2018 and 2019, and significant at a probability level (5%) for the meta-analysis and was not significant. For the second generation 2019, the general ability was significant at the probability level (1%) for all generations except for the second generation 2019, while the special general ability was significant at the probability level (1%) for all generations, and that the ratio between the components of the general and special general capabilities was less than the correct one for all generations except for the first generation 2018. From the above, it appears that both the variations of the general and private general capabilities are important, which reflects the importance of both the additional and dominant variations in the inheritance of the protein ratio in the first generation. The right one.

Table 5 indicates that among the averages of parents in the first generation 2018, the parent (10) outperformed the highest protein ratio of 14.893% and the lowest protein percentage was in the parent (6) which was 13.103%. In parents 4, 5 and 10, and positive morale at the probability level (5%) in parent 9, and higher in the effect of the general ability of parents 4 and 5, the values of their effects were 0.297 and 0.281, respectively, while the variance values of the effect of their special general ability were 1.940 and 2.181 Respectively, which are low values, indicating that these two parents transfer their genes to their crosses on a regular basis, which makes it easier to trace them in future generations.

Table 6 for the first generation 2018 shows the superiority of hybrids (6 × 10) with the highest protein percentage reaching 16.54% and the lowest protein percentage in the hybrid (1 × 8) reaching 12.56%. In camels (1 × 4), (1 × 6), (1 × 10), (2 × 3), (2 × 7), (2 × 9), (4 × 8) and (5 × 8) And (6 × 8), (6 × 10) and (7 × 8) and positive significant in the desired direction at a probability level of (5%) in (2 × 4) and (3 × 5) and (4 × 9) and (7 x 9). From the same generation, it is noticed that the hybrid strength of the mean of the two parents is positive and significant in the desired direction at the level of probability (1%) in the crosses (1 × 4), (1 × 6), (2 × 3), (2 × 4) and (2 ×) 5), (2 × 7), (2 × 8), (2 × 9), (3 × 5), (3 × 6), (4 × 5), (4 × 6), (4 × 7) (4 × 8), (4 × 9), (5 × 6), (5 × 8), (6 × 7), (6 × 8), (6 × 9), (6 × 10) and ((7 × 8) and (7 × 9) and significant positive in the desired direction at a probability level of (5%) in (1 × 10) and (4 × 3) hybrids, while the strength of the hybrid was positive for the best parents in the desired direction at the level of probability (1%) in hybrids (2 × 3), (2 × 4), (2 × 7), (2 × 8), (4 × 8), (4 × 9), (5 × 8) and (6 ×) 8) and (7 × 8) and a significant positive at a probability level of (5%) in (1 × 4), (1 × 6), (5 × 2) and (4 × 7) hybrids. The hybrid (4 × 8) outperformed the highest protein ratio of 16.150% and the lowest protein percentage in the hybrid (8 × 10) was (12.790). As for the rest of the hybrids, it was a median between the two ratios. (1%) in hybrids (1 × 4), (1 × 6), (2 × 3), (2 × 7), (2 × 8), (2 × 9), (3 × 5) and (3) (× 7), (3 × 8), (3 × 10), (4 × 7), (4 × 8), (4 × 9), (5 × 8), (6 × 10), (7 × 8)) And (9 x 10) and positive significance of the desired direction at a probability level of (5%) in (1 × 10), (6 × 8) and (7 × 9) hybrids. And the strength of the hybrid over the average of the hybrid was positive and significant in the desired direction at a probability level of (1%) in (1 × 4), (1 × 6), (2 × 7), (2 × 8), (2 × 9) and (3 × 4, (3 × 5), (3 × 6), (3 × 7), (3 × 8), (3 × 10), (4 × 5), (4 × 7) and (4 × 8), (4 × 9), (4 × 10) 5 × 6), (5 × 7), (5 × 8), (5 × 10), (6 × 7), (6 × 8) and (6 × 10), (7 × 8), (8 × 9) and (9 × 10), while the strength of the crossbreed over the best parents was positive and significant in the desired direction at a probability level of (1%) in (2 × 3) and (2 × 3) hybrids. 2 × 7, 2 × 8, (3 × 5), (3 × 7), (3 × 8), (4 × 7), (4 × 8), (4 × 9) and (5 × 8) And (5 × 10), (6 × 8), (6 × 10), (7 × 8) and (9 × 10), positive and significant in the desired direction at a probability level of (5%) in (5 × 6) hybrids. From the average of the hybrids in the pooled analysis, the superiority of the hybrid (6 × 10) was observed with the highest protein percentage reaching 16,213% and the lowest protein percentage in the hybrid (1 × 8) reaching 12.938%. (1× 4), (1 × 6), (1 × 10), (2 × 3), (2 × 7), (2 × 9), (3 × 5), (4 × 8) and (4) (× 9), (5 × 8), (6 × 8), (6 × 10), (7 × 8) and positive significant in the desired direction at a probability level of (5%) in (3 × 10) and (4 × 7) hybrids) And (7 × 9), while the strength of the crossbreed over the average of the two parents was positive and significant in the desired direction at a probability level (1%) in the hybrids (1 × 4) and (1 × 6) and (2 × 3) 2 × 7) and (2 × 8), (2 × 9), (3 × 5), (3 × 6), (3 × 7), (3 × 8), (3 × 10), (4 × 5) and (4) (× 7), (4 × 8), (4 × 9), (5 × 6), (5 × 8), (6 × 7), (6 × 8), (6 × 10), (7 × 8)) And (7 × 9) and (8 × 9) and positive significance in the desired direction at a probability level of (5%) in (4 × 2), (3 × 4), (4 × 10), (5 × 10) and (5 × 10) hybrids. (6 x 9) and (9 x 10). From the above, it is noticed that the hybrids (2 × 7) and (2 × 8) and (4 × 7) and (4 × 8) and (4 × 9) and (5 × 8) and (7 × 8) were of hybrid strength Moral positive and in both concepts and influences of the special general ability is positive and Moral, which is recommended for breeding with hybrid strength in such hybrids. And in the second generation 2019, the superiority of the hybrid (4 × 8) is observed with the highest protein percentage reaching 15.917% and the lowest protein percentage in the hybrid (1 × 8) reaching 13.223%. 4 × 8), (6 × 10) and (9 × 10), while the strength of the hybrid over the average of the two parents was positive and significant at a probability level (1%) in the (1 × 10), (2 × 6) and (2 ×) 9), (2 × 10), (3 × 5), (3 × 10), (4 × 6), (4 × 8), (4 × 9), (4 × 10) and (5 × 10) And (6 × 8) 6 × 10), (7 × 10), (8 × 10) and (9 × 10), while the strength of the crossbreed over the best parents was positive and significant at the probability level (1%) in the hybrids (2 × 6). (2 × 9), (3 × 5) 4 × 8), (6 × 10), (7 × 10) and (9 × 10), and a significant positive in the desired direction at a probability level of (5%) in (4 × 6) hybrids.

Discussion

From the results of the first generation 2019, and from the average of the parents, it is noticed that parent 1 excelled with the highest protein ratio of 15.203% and the lowest protein percentage that was in parent 3 was 11.973%. And a significant positive in the desired direction at a probability level (5%) in parent 6, and the 5 and 9 parents were distinguished by the highest effect of the general ability, amounting to 0.409 and 0.256, respectively. The effect variance values of their own ability were 5.182 and 2.858, respectively, and this indicates that parent 5 transmitted a gene effect. For the protein trait to be part of his hybrid without the other, Father 9 transfers this trait to one part of his hybrid regularly. In the meta-analysis, parent 1 outperformed the other parents with the highest protein ratio of 14.82%, where the lowest protein percentage in Fath 3 was 13.12%, and the effect of the general ability was significantly desirable in the desired direction at a probability level (1%) in the 5 parents and 9 and 10, and a significant positive in the desired direction, at a probability level (5%) in 4. Which confirms that parents 5, 9, and 10 have a latent ability to increase the protein percentage when they are included in the crossbreeding programs, as it has positive and significant effects of the general ability. And 15.013%, respectively, while the lowest protein percentage in parent 10 was 11,560%, and from the same generation the effect of the general federal ability was significantly positive.

In the desired direction at a probability level (1%) in parents 8 and 9. It is noticed that parent 9 had a general ability to increase the percentage of protein in all generations, indicating that he possessed an inherent federal ability across generations to improve this trait. Table 6 for the first generation 2018 shows the superiority of hybrids (6 × 10) with the highest protein percentage reaching 16.54% and the lowest protein percentage in the hybrid (1 × 8) reaching 12.56%. In camels (1 × 4), (1 × 6), (1 × 10), (2 × 3), (2 × 7), (2 × 9), (4 × 8) and (5 × 8) And (6 × 8), (6 × 10) and (7 × 8) and positive significant in the desired direction at a probability level of (5%) in (2 × 4) and (3 × 5) and (4 × 9) and (7 x 9). From the same generation, it is noticed that the hybrid strength of the mean of the two parents is positive and significant in the desired direction at the level of probability (1%) in the crosses (1 × 4), (1 × 6), (2 × 3), (2 × 4) and (2 ×) 5), (2 × 7), (2 × 8), (2 × 9), (3 × 5), (3 × 6), (4 × 5), (4 × 6), (4 × 7) (4 × 8), (4 × 9), (5 × 6), (5 × 8), (6 × 7), (6 × 8), (6 × 9), (6 × 10) and ((7 × 8) and (7 × 9) and significant positive in the desired direction at a probability level of (5%) in (1 × 10) and (4 × 3) hybrids, while the strength of the hybrid was positive for the best parents in the desired direction at the level of probability (1%) in hybrids (2 × 3), (2 × 4), (2 × 7), (2 × 8), (4 × 8), (4 × 9), (5 × 8) and (6 ×) 8) and (7 × 8) and a significant positive at a probability level of (5%) in (1 × 4), (1 × 6), (5 × 2) and (4 × 7) hybrids. The hybrid (4 × 8) outperformed the highest protein ratio of 16.150% and the lowest protein percentage in the hybrid (8 × 10) was (12.790). As for the rest of the hybrids, it was a median between the two ratios. (1%) in hybrids (1 × 4), (1 × 6), (2 × 3), (2 × 7), (2 × 8), (2 × 9), (3 × 5) and (3) (× 7), (3 × 8), (3 × 10), (4 × 7), (4 × 8), (4 × 9), (5 × 8), (6 × 10), (7 × 8)) And (9 x 10) and positive significance of the desired direction at a probability level of (5%) in (1 × 10), (6 × 8) and (7 × 9) hybrids. And the strength of the hybrid over the average of the hybrid was positive and significant in the desired direction at a probability level of (1%) in (1 × 4), (1 × 6), (2 × 7), (2 × 8), (2 × 9) and (3 × 4, (3 × 5), (3 × 6), (3 × 7), (3 × 8), (3 × 10), (4 × 5), (4 × 7) and (4 × 8), (4 × 9), (4 × 10) 5 × 6), (5 × 7), (5 × 8), (5 × 10), (6 × 7), (6 × 8) and (6 × 10), (7 × 8), (8 × 9) and (9 × 10), while the strength of the crossbreed over the best parents was positive and significant in the desired direction at a probability level of (1%) in (2 × 3) and (2 × 3) hybrids. 2 × 7, 2 × 8, (3 × 5), (3 × 7), (3 × 8), (4 × 7), (4 × 8), (4 × 9) and (5 × 8) And (5 × 10), (6 × 8), (6 × 10), (7 × 8) and (9 × 10), positive and significant in the desired direction at a probability level of (5%) in (5 × 6) hybrids. From the average of the hybrids in the pooled analysis, the superiority of the hybrid (6 × 10) was observed with the highest protein percentage reaching 16,213% and the lowest protein percentage in the hybrid (1 × 8) reaching 12.938%. (1 ÷ 4), (1 × 6), (1 × 10), (2 × 3), (2 × 7), (2 × 9), (3 × 5), (4 × 8) and (4) (× 9), (5 × 8), (6 × 8), (6 × 10), (7 × 8) and positive significant in the desired direction at a probability level of (5%) in (3 × 10) and (4 × 7) hybrids) And (7 × 9), while the strength of the crossbreed over the average of the two parents was positive and significant in the desired direction at a probability level (1%) in the hybrids (1 × 4) and (1 × 6) and (2 × 3) 2 × 7) and (2 × 8), (2 × 9), (3 × 5), (3 × 6), (3 × 7), (3

× 8), (3 × 10), (4 × 5) and (4) (× 7), (4 × 8), (4 × 9), (5 × 6), (5 × 8), (6 × 7), (6 × 8), (6 × 10), (7 × 8)) And (7 × 9) and (8 × 9) and positive significance in the desired direction at a probability level of (5%) in (4 × 2), (3 × 4), (4 × 10), (5 × 10) and (5 × 10) hybrids. (6 x 9) and (9 x 10). From the above, it is noticed that the hybrids (2 × 7) and (2 × 8) and (4 × 7) and (4 × 8) and (4 × 9) and (5 × 8) and (7 × 8) were of hybrid strength Moral positive and in both concepts and influences of the special general ability is positive and Moral, which is recommended for breeding with hybrid strength in such hybrids. And in the second generation 2019, the superiority of the hybrid (4 × 8) is observed with the highest protein percentage reaching 15.917% and the lowest protein percentage in the hybrid (1 × 8) reaching 13.223%. 4 × 8), (6 × 10) and (9 × 10), while the strength of the hybrid over the average of the two parents was positive and significant at a probability level (1%) in the (1 × 10), (2 × 6) and (2 ×) 9), (2 × 10), (3 × 5), (3 × 10), (4 × 6), (4 × 8), (4 × 9), (4 × 10) and (5 × 10) And (6 × 8) 6 × 10), (7 × 10), (8 × 10) and (9 × 10), while the strength of the crossbreed over the best parents was positive and significant at the probability level (1%) in the hybrids (2 × 6). (2 × 9), (3 × 5) 4 × 8), (6 × 10), (7 × 10) and (9 × 10), and a significant positive in the desired direction at a probability level of (5%) in (4 × 6) hybrids.

Conclusions

which is recommended to be included in breeding and crossbreeding programs to increase and improve this trait in misc for the wheat. While if the hybrid strength was high in the first generation and deteriorated greatly in the second generation, then the dominance effect of genes is clear in its performance on the trait. This is in line with findings by Saud and Al- Mamoun et al, 2018). general ability of parents 4 and 5, the values of their effects were 0.297 and 0.281, respectively, while the variance values of the effect of their special general ability were 1.940 and 2.181 Respectively, which are low values, indicating that these two parents transfer their genes to their crosses on a regular basis, which makes it easier to trace them in future generations. the protein percentage when they are included in the crossbreeding programs, as it has positive and significant effects of the general ability. And 15.013%, respectively, while the lowest protein percentage in parent 10 was 11,560%, and from the same generation the effect of the general federal ability was significantly positive. While the strength of the crossbreed over the best parents was positive and significant at the probability level (1%) in the hybrids (2 × 6). (2 × 9), (3 × 5) 4 × 8), (6 × 10), (7 × 10) and (9 × 10), and a significant positive in the desired direction at a probability level of (5%) in (4 × 6) hybrids.

- Use of fathers 4 and 7
- Use and follow the hybrids (1 x 8), (6 x 9) and (7 x 10). And (8 × 10), (2 × 6) and (2 × 10)
- Using the hybridization method to develop new hybrids
- Use the mentioned fertilizer ratios

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Table (1): Analysis of variance for the first generation 2018, 2019, pooled, and second generation 2019 for plant yield (g. Vegetation)

D.F	**df.**		**Ms.**		
F	Comb	F1 2018	F1 2019	Comb	**F2 2019**
Years	1			437.58	
Rep	4	3823.22	6534.05	5178.63	**16489.88**
Geneotyps	54	**189.12	**141.14	**238.50	****2275.27**
P	9	**229.87	**207.30	**355.28	****143.98**
H	44	**184.77	**130.16	**219.09	****2762.89**
P /H	1	14.19	28.76	41.67	**NS 1.59**
G/y	54			**91.76	
par./y	9			81.89	
Cr./y	44			**95.84	
Par. vs. cr. Vs. y	1			1.27	
Error	108	43.32	56.15		**683.682**
Error Comp	216			49.74	
GCA	9	**52.81	*38.60	**65.86	****681.500**
SCA	45	**65.09	**48.74	**82.23	****773.809**
GCA x y	9			25.55	
SCA x y	45			**31.59	
Error	108	14.44	18.72		**227.89**
Error Comp	216			16.58	
Perc GCA/SCA		0.81	0.79	0.80	**0.8807**
GCA x y/GCA				0.39	
SCA x y/SCA				0.38	

Tables (2): Parent performance, the effect of general ability, and the variations of the general and private values of each Father for protein percentage

F2 2019		COMP		F1 2019				F1 2018				
GCA	AV _P	GCA	AV _P	σ_s^2	σ_g^2	GCA	AV _P	σ_s^2	σ_g^2	GCA	AV _P	Par
-0.441	62.920	1.94	50.92	3327.113	275.068	0.775	56.253	6070.075	251.944	**3.109	45.587	1
-6.216	45.877	-0.86	39.043	119.415	3.705	*-2.611	39.210	262.460	-0.678	0.889	38.877	2
-4.496	43.587	-0.40	43.253	571.630	-0.662	0.498	43.587	133.315	-0.647	-1.307	42.920	3
-3.376	59.730	1.15	60.396	537.238	22.208	*2.730	59.730	369.546	3.700	-0.437	61.063	4
-5.118	58.413	-1.00	51.746	49.877	0.792	-1.402	55.080	59.733	6.695	-0.596	48.413	5
-4.561	49.260	-0.91	42.093	356.026	3.112	-0.483	48.593	261.407	2.090	-1.345	35.593	6
**13.138	55.453	**-3.31	34.453	371.276	-1.286	*-2.507	37.787	514.554	-0.020	**-4.118	31.120	7
-1.470	45.817	0.43	37.816	272.119	5.771	0.941	37.817	493.675	1.727	-0.087	37.817	8
-2.104	50.193	*2.29	42.693	307.067	21.122	2.113	43.860	384.324	32.149	*2.474	41.527	9
**14.645	45.387	0.68	45.72	344.517	1.804	-0.055	39.053	120.443	7.174	1.417	52.387	10
7.160	10.914	2.19	1.699			2.33	1.806			2.05	1.256	LSD 5%
7.223	10.804	2.87	1.682			3.074	1.788			2.70	1.243	LSD 1%

Table (3): The performance of hybrids and the effect of the special ability and the strength of the hybrid for the mean of the two parents, the best of which are for the individual plant yield

F2 2019				COMP			F1 2019				F1 2018				H
PEST-P	A-P	SCA	A-H	A-P	SCA	A-H	PEST-P	A-P	SCA	A-H	PEST-P	A-P	SCA	A-H	
**-13.445	0.113	**9.246	54.460	**21.072	*9.32	54.46	**-20.965	**-6.854	1.084	44.460	**41.401	**52.634	**17.55	64.46	**2×1**
**-30.705	**-18.127	-3.334	43.600	**-16.608	-6.33	39.265	**-22.493	**-12.66	-2.885	43.600	**-23.369	**-21.061	**-9.78	34.93	**3×1**
**-25.407	**-23.467	-1.122	46.932	**-15.676	-0.22	46.933	**-21.424	**-19.069	-1.783	46.933	**-23.14	**-11.986	1.35	46.93	**4×1**
**-20.904	**-17.967	3.454	49.767	**-26.753	*-7.40	37.6	**-32.863	**-32.156	-6.818	37.767	**-22.68	**-20.355	**-7.99	37.43	**5×1**
**-34.011	**-25.976	-5.349	41.520	*-10.722	-3.57	41.52	**-26.191	**-20.799	-3.983	41.520	**-8.920	*2.291	-3.15	41.52	**6×1**
**-25.143	**-20.421	**-17.46	47.100	**-13.868	-5.92	36.766	**-34.048	**-21.097	-6.380	37.100	**-20.079	**-5.006	*-5.47	36.43	**7×1**
**-6.887	**7.758	**8.626	58.587	**23.782	*8.49	54.92	**-7.703	**10.386	4.992	51.920	**27.055	**38.891	**11.99	57.92	**8×1**
**-25.683	**-17.321	-2.567	46.760	**-17.191	*-9.54	38.76	**-28.727	**-19.904	*-8.006	40.093	**-17.9	**-14.074	**-11.06	37.43	**9×1**
**-19.373	**-6.321	**-15.346	50.730	**15.680	*9.21	55.896	**-9.818	**6.456	4.799	50.730	**16.563	**24.653	**13.63	61.06	**10x1**
**-15.280	**-13.111	-2.293	38.867	-5.545	-3.92	38.866	**-10.829	**-6.115	-4.232	38.867	**-9.443	**-4.967	-3.62	38.87	**3×2**
**-20.910	**-10.535	4.960	47.240	-4.988	2.89	47.24	**-20.911	**-4.507	1.909	47.240	**-22.638	**-5.463	3.88	47.24	**4×2**
**-30.112	**-21.711	0.286	40.823	**-19.250	-5.54	36.656	**-31.935	**-20.479	-3.709	37.490	**-26.005	**-17.921	**-7.38	35.82	**5×2**
**-6.996	**-3.689	4.719	45.813	9.231	2.03	44.313	**-5.720	**4.354	3.696	45.813	**10.126	**14.981	0.36	42.81	**6×2**
**-15.490	**-7.503	**-11.93	46.863	**17.094	3.14	43.03	**11.018	**13.07	3.436	43.530	**9.397	**21.52	2.85	42.53	**7×2**
**-10.010	**-10.069	-2.956	41.230	5.551	-3.06	40.563	**5.151	**7.053	-2.312	41.230	**2.623	**4.042	-3.81	39.90	**8×2**
0.431	**4.944	*6.858	50.411	**28.649	7.08	52.576	**14.934	**21.368	5.696	50.410	**31.827	**36.172	*8.47	54.74	**9×2**
**-15.999	**-15.548	**-21.76	38.537	-9.072	-5.34	38.536	-1.717	-1.520	-4.009	38.537	**-26.438	**-15.548	-6.68	38.54	**10×2**
**-41.676	**-32.563	**-9.163	34.837	**-31.172	*-9.13	35.67	**-41.676	**-32.563	**-13.60	34.837	**-40.221	**-29.79	-4.66	36.50	**4×3**
**-27.921	**-17.444	-0.154	42.103	**-18.379	-3.88	38.77	**-29.611	**-21.412	-5.538	38.770	**-19.919	**-15.102	-2.23	38.77	**5×3**
**12.755	**19.645	*812.73	55.543	*10.631	4.47	47.21	**7.442	**13.278	6.984	52.210	-1.654	**7.523	1.95	42.21	**6×3**
0.871	**12.957	-4.577	55.937	**26.810	*8.93	49.27	**28.334	**37.482	**12.73	55.937	-0.737	**15.082	*5.12	42.60	**7×3**
**23.026	**26.095	**10.461	56.367	**23.432	5.95	50.033	**21.673	**30.298	6.383	53.033	**9.583	**16.51	*5.52	47.03	**8×3**
1.002	**8.118	5.425	50.697	*10.991	1.75	47.696	**7.987	**8.325	-0.459	47.363	**11.906	**13.752	3.96	48.03	**9×3**
**13.498	**15.794	**-10.51	51.513	4.556	2.18	46.513	**18.186	**24.669	5.859	51.513	**-20.756	**-12.885	-1.51	41.51	**10×3**
**-31.352	**-30.587	-2.374	41.003	**-26.279	-2.87	41.336	**-31.352	**-28.572	-5.536	41.003	**-31.759	**-23.874	-0.21	41.67	5×4
**-43.049	**-37.578	**-9.918	34.017	**-33.620	**-10.28	34.016	**-43.049	**-37.194	**-13.441	34.017	**-44.293	**-29.613	-**7.11	34.02	6×4
**-17.701	**-14.646	**-12.48	49.157	**-19.192	-3.57	38.323	**-17.702	0.817	3.722	49.157	**-54.981	**-40.358	**-10.86	27.49	7×4

Table (3): Continued

**-10.089	1.762	*6.677	53.703	**-14.397	-3.60	42.036	**-10.09	**10.108	4.821	53.703	**-50.265	**-38.572	**-12.01	30.37	8×4
**-25.587	**-19.131	-1.946	44.447	**-13.771	-3.05	44.446	**-25.587	**-14.187	-5.607	44.447	**-27.212	**-13.351	-0.50	44.45	9×4
-0.742	**12.801	-3.855	59.287	*-10.250	1.73	47.62	-0.742	**20.034	**11.400	59.287	**-41.121	**-36.618	*-7.94	35.95	10×4
**-24.554	**-18.141	1.878	44.070	-7.495	1.26	43.403	**-19.989	**-14.983	0.744	44.070	**-11.725	1.745	1.77	42.74	6×5
**-30.238	**-28.425	**-19.14	40.750	-5.452	1.00	40.75	**-26.017	**-12.24	-0.553	41.750	**-15.829	*2.472	2.56	40.75	7×5
**-22.620	**-13.268	-0.083	45.200	1.306	1.88	45.366	**-17.938	**-2.687	0.449	45.200	**-5.948	**5.609	3.31	45.53	8×5
**-31.608	**-26.431	-4.699	39.950	**-15.396	-5.40	39.95	**-27.469	**-19.244	-5.972	39.950	**-17.481	**-11.163	-4.84	39.95	9×5
**-16.668	**-6.210	**-12.72	48.677	-6.956	1.60	45.343	**-17.677	**-3.661	1.589	45.343	**-13.445	**-10.033	1.61	45.34	10×5
**-38.494	**-34.857	**-26.34	34.107	*-10.887	-5.73	34.106	**-29.812	**-21.031	*-8.115	34.107	**-4.176	*2.248	-3.34	34.11	7×6
**3.187	**6.924	4.989	50.830	*10.533	0.59	44.163	**-9.116	*2.218	-1.506	44.163	**16.783	**20.32	2.69	44.16	8×6
**4.343	**5.322	*7.167	52.372	**29.045	*9.27	54.706	**7.778	**13.297	5.533	52.373	**37.358	**47.925	**13.00	57.04	9×6
**19.901	**24.808	-2.893	59.063	4.912	2.24	46.063	**-5.206	**5.111	1.390	46.063	**-12.071	**4.713	3.08	46.06	10×6
**-11.968	**-3.591	**-14.72	48.817	**39.708	*9.31	50.483	**24.68	**24.73	3.504	47.150	**42.309	**56.134	**15.11	53.82	8×7
**-12.521	**-8.165	**-14.39	48.510	**25.760	5.47	48.51	**10.602	**18.829	3.693	48.510	**16.817	**33.551	**7.25	48.51	9×7
**-3.522	**6.101	3.027	53.500	**-13.271	-6.66	34.766	**-9.269	**-7.773	*-7.217	35.433	**-34.907	**-18.33	**-6.11	34.10	10×7
**16.290	**21.591	**10.072	58.370	**24.299	3.26	50.036	**33.083	**42.929	**10.105	58.370	0.425	**5.121	-3.59	41.70	9×8
**5.230	**5.727	**-16.83	48.213	**-12.501	*-8.62	36.546	*-2.150	-0.576	*-7.884	38.213	**-33.418	**-22.664	**-9.36	34.88	10×8
**6.468	**11.822	**-10.97	53.440	**13.34	3.07	50.106	**21.842	**28.906	6.171	53.440	**-10.715	-0.390	-0.03	46.77	10×9
36.977	32.023	3.200	13.153	4.986	3.751	3.606	6.118	5.298	3.572	3.831	4.253	3.683	2.483	2.663	LSD 5%
SE HBp	SE HMp	SE Sij	12.919	SE HMp	SE Sij	3.569	SE HBp	SE HMp	SE Sij	3.792	SE HBp	SE HMp	SE Sij	2.636	LSD 1%

* p< 0.05; ** p< 0.01

Table (4): Analysis of variance for the first generation 2018, 2019, pooled, and second generation 2019 for protein percentage%

D.F	**df.**		**Ms.**		
F	Comb	F1 2018	F1 2019	Comb	**F2 2019**
Years	1			0.19	
Rep	4	7.32	9.43	8.37	**37.16**
Geneotyps	54	**1.70	**2.70	**3.57	****1.44**
P	9	**1.00	**3.01	**2.43	****3.78**
H	44	**1.84	**2.47	**3.65	****0.98**
P/ H	1	**1.85	**9.93	*10.18	**NS 0.60**
G/y	54			**0.83	
par./y	9			**1.58	
Cr./y	44			**0.66	
Par. vs. cr. Vs. Y	1			*1.60	
Error	108	0.10	0.17		**0.756**
Error Comp	216			0.14	
GCA	9	**0.62	**0.77	**1.04	**0.325**
SCA	45	**0.56	**0.93	**1.22	****0.510**
GCA x y	9			**0.34	
SCA x y	45			**0.26	
Error	108	0.03	0.06		**0.252**
Error Comp	216			0.05	
Perc GCA/SCA		1.11	0.83	0.85	**0.637**
GCA x y/GCA				0.33	
SCA x y/SCA				0.22	

Table (5): Indicates that among the averages of parents in the first generation

F2 2019		C OM		F1 2019				F1 2018				par
GCA	AV _P	GCA	AV _P	σ_s^2	σ_g^2	GCA	AV _P	σ_s^2	σ_g^2	GCA	AV _P	**Par**
**-0.157	15.437	**-0.23	14.82	6.440	-0.002	-0.051	15.203	6.536	0.063	**-0.400	14.44	**1**
0.079	14.747	**-0.21	13.63	6.265	0.078	**-0.321	13.547	2.494	0.002	*-0.109	13.73	**2**
*-0.157	14.617	**-0.29	13.12	7.981	0.110	**-0.364	11.973	2.125	0.044	**-0.212	14.28	**3**
0.033	14.503	*0.12	13.72	6.325	0.013	-0.066	13.270	1.940	0.047	**0.297	14.17	**4**
0.127	14.620	**0.34	14.61	5.182	0.137	**0.409	14.617	2.181	0.042	**0.281	14.620	**5**
-0.011	13.770	0.04	13.60	2.871	0.004	*0.158	14.103	5.567	0.013	-0.080	13.103	**6**
-0.036	14.570	*-0.13	13.73	5.551	0.051	**-0.230	12.903	1.952	0.003	-0.024	14.570	**7**
**0.207	15.493	0.01	13.48	8.451	0.041	0.103	13.480	6.175	0.000	-0.086	13.493	**8**
**0.206	15.013	**0.18	14.76	2.858	0.068	**0.256	14.857	1.133	0.003	*0.101	14.680	**9**
**-0.291	11.560	**0.17	14.74	8.867	0.005	0.106	14.593	6.880	0.028	**0.233	14.893	**10**
0.137	0.210	0.11	0.090			0.13	0.099			0.10	0.075	**LSD 5%**
0.142	0.208	0.15	0.089			0.17	0.098			0.13	0.075	**LSD 1%**

Table (6): The performance of the hybrids and the effect of the special ability and the strength of the cross between the parents average and the best of the two for the protein ratio trait

F2 2019				COMP			F1 2019				F1 2018				H
PEST-P	A-P	SCA	A-H	A-P	SCA	A-H	PEST-P	A-P	SCA	A-H	PEST-P	A-P	SCA	A-H	
**-11.509	**-9.486	*-0.823	13.660	**-4.609	*-0.39	13.573	**-9.098	**-3.860	-0.183	13.820	**-7.688	**-5.372	**-0.59	13.33	2×1
**-5.916	**-3.349	0.276	14.523	**-5.528	**-0.68	13.201	**-13.089	**-2.759	**-0.747	13.213	**-8.635	**-8.147	**-0.62	13.19	3×1
**-8.507	**-5.655	-0.313	14.123	**4.811	**0.67	14.956	-0.526	**6.228	**0.866	15.123	*2.447	**3.402	**0.47	14.79	4×1
**-5.268	**-2.694	0.092	14.623	-0.651	0.10	14.623	**-3.815	-1.922	-0.109	14.623	0.022	0.653	0.32	14.62	5×1
**-6.413	-1.072	0.054	14.447	**6.555	**0.93	15.143	1.995	**5.823	**1.025	15.507	*2.378	**7.334	**0.84	14.78	6×1
**-2.828	-0.022	0.633	15.000	-**6.980	**-0.76	13.281	**-12.98	**-5.858	**-0.864	13.230	**-8.487	**-8.067	**-0.66	13.33	7×1
**-14.651	**-14.495	**-1.387	13.223	**-8.584	**-1.24	12.938	**-12.388	**-7.123	*-81.107	13.320	**-13.022	**-10.085	**-1.38	12.56	8×1
**-13.215	**-12.008	**-1.213	13.397	**-9.446	**-0.96	13.396	**-11.883	**-10.867	**-1.183	13.397	**-8.742	**-7.979	**-0.73	13.40	9×1
**-6.629	**6.778	0.300	14.413	0.980	**0.58	14.926	*-2.170	-0.1678	*0.444	14.873	0.581	*2.148	**0.72	14.98	10×1
-1.672	-1.237	0.017	14.500	**13.05	**1.23	15.13	**11.959	**18.861	**1.476	15.167	**5.670	**7.758	**0.99	15.09	3×2
-0.904	-0.079	-0.059	14.613	*3.173	-0.19	14.113	0.075	-0.957	**-0.708	13.280	**5.481	**7.144	*0.34	14.95	4×2
1.152	1.589	0.150	14.917	-0.22	*-0.43	14.096	**-9.167	**-5.716	**-1.187	13.277	*2.029	**5.232	0.32	14.92	5×2
**2.622	**6.136	0.504	15.133	0.091	**-0.59	13.633	*-2.150	-0.180	*-0.413	13.800	-1.917	0.372	**-0.77	13.47	6×2
-1.198	-0.602	-0.033	14.570	**8.943	**0.85	14.911	**10.138	**12.817	**1.095	14.920	**2.287	**5.323	**0.61	14.90	7×2
**-7.099	**-4.805	-0.453	14.393	**7.354	0.37	14.56	**9.248	**8.978	**0.569	14.727	**4.831	**5.742	0.17	14.39	8×2
**3.507	**4.435	0.695	15.540	**4.764	**0.52	14.88	0.201	**4.823	**0.576	14.887	1.317	**4.704	**0.46	14.87	9×2
**-3.051	**8.692	-0.052	14.297	**-3.905	**-0.72	13.636	**-8.794	**-5.401	**-0.850	13.310	**-6.244	*-2.433	**-0.58	13.96	10×2
**-7.343	**-6.982	*-0.894	13.543	*2.650	*-0.45	13.78	-1.909	**3.129	**-0.928	13.017	1.820	*2.225	0.04	14.54	4×3
**3.944	**3.956	0.666	15.197	**11.34	**0.99	15.446	**9.669	**20.572	**1.610	16.030	1.664	**2.848	*0.37	14.86	5×3
**-2.896	0	-0.200	14.193	**6.689	0.11	14.26	1.583	**9.881	0.157	14.327	-0.630	**3.651	0.06	14.19	6×3
**-2.006	-1.850	-0.044	14.323	**6.756	0.36	14.34	**16.43	**20.783	**1.242	15.023	**-6.268	**-5.337	**-0.53	13.66	7×3
**-9.143	**-6.498	-0.534	14.077	**7.182	0.14	14.263	**9.668	**16.16	**0.668	14.783	**-3.780	-1.044	*-0.38	13.74	8×3
**-6.616	**-5.366	-0.589	14.020	*-2.640	**-0.71	13.58	**-8.593	1.23	**-0.688	13.580	**-7.493	**-6.226	**-0.73	13.58	9×3
0.410	**12.135	0.563	14.677	**5.316	*0.40	14.676	0.571	**10.489	**0.560	14.677	-1.454	0.605	0.23	14.68	10×3
-0.387	0.011	-0.158	14.563	**5.13	0.04	14.896	1.915	**6.837	0.179	14.897	1.892	**3.485	-0.10	14.90	5×4
*2.068	**4.715	0.221	14.803	1.036	**-0.75	13.803	**-4.372	-1.461	**-0.980	13.487	-0.352	**3.544	**-0.52	14.12	6×4
*-2.493	*-2.270	-0.351	14.207	**8.34	*0.49	14.873	**12.082	**13.653	**0.795	14.873	*2.081	**3.502	0.18	14.87	7×4

Table (6): Continued

**2.732	**6.122	**1.116	15.917	**17.86	**1.51	16.033	**19.807	**20.748	**1.738	16.150	**12.327	**15.074	**1.28	15.92	8×4
1.021	**2.766	0.367	15.167	**7.096	**0.56	15.255	**3.275	**9.101	**0.778	15.343	**3.315	**5.141	*0.35	15.17	9×4
0.804	**12.188	0.317	14.620	*2.728	-0.06	14.62	0.182	**4.940	0.206	14.620	-1.835	0.607	*-0.33	14.62	10×4
*-2.029	0.904	-0.354	14.323	**3.785	-0.14	14.645	*2.394	**4.224	0.025	14.967	*-2.029	**3.330	-0.30	14.32	6×5
**-3.465	**-3.300	-0.538	14.113	-1.393	**-0.64	13.98	**-2.987	**3.052	-0.374	14.180	**-5.745	**-5.584	**-0.90	13.78	7×5
*-2.022	0.819	0.285	15.180	**12.76	**1.09	15.846	**8.415	**12.801	**0.960	15.847	**8.390	**12.734	**1.23	15.85	8×5
*-2.020	-0.719	-0.183	14.710	0.113	-0.21	14.71	-0.987	-0.181	-0.330	14.710	0.204	0.409	-0.09	14.71	9×5
1.413	**13.267	0.429	14.827	*2.491	0.13	15.046	**4.447	**4.530	0.377	15.267	-0.447	0.474	-0.11	14.83	10×5
-1.830	0.940	-0.210	14.303	**4.633	-0.01	14.303	1.418	**5.924	0.000	14.303	-1.830	**3.372	-0.01	14.30	7×6
*-2.345	**3.405	0.373	15.130	**11.701	**0.68	15.13	**7.279	**9.703	*0.493	15.130	**12.129	**13.774	**0.87	15.13	8×6
**-2.619	1.586	-0.135	14.620	*2.332	-0.10	14.516	**-2.984	-0.460	-0.376	14.413	-0.408	**5.243	0.18	14.62	9×6
**12.878	**22.726	**1.284	15.543	**14.39	**1.61	16.213	**8.839	**10.698	**1.245	15.883	**11.079	**18.181	**1.97	16.54	10×6
**-6.002	**-3.115	-0.168	14.563	**10.90	**0.82	15.096	**11.993	**14.441	**0.848	15.097	**3.614	**7.59	**0.78	15.10	8×7
**-2.930	-1.476	-0.156	14.573	**4.461	*0.44	14.888	0.089	**7.132	*0.469	14.870	1.544	1.925	*0.41	14.91	9×7
**2.516	**14.325	0.703	14.937	**-3.698	**-0.73	13.713	**-10.484	**-4.982	**-1.187	13.063	**-3.558	*-2.500	-0.27	14.36	10×7
**-4.754	**-3.256	-0.216	14.757	**3.769	0.07	14.66	-1.974	**2.787	-0.171	14.563	0.522	**4.756	0.32	14.76	9×8
**-6.906	**6.628	-0.054	14.423	**-7.970	**-1.59	12.99	**-12.357	**-8.881	**-1.794	12.790	**-11.437	**-7.069	**-1.38	13.19	10×8
**5.395	**19.091	**1.348	15.823	*2.377	0.36	15.106	**5.833	**6.779	**0.987	15.723	**-2.708	*-2.006	-0.27	14.49	10×9
0.710	0.614	0.414	0.446	0.316	0.196	0.191	0.340	0.295	0.198	0.211	0.2565	0.222	0.149	0.160	LSD 5%
SE HBp	SE HMp	SE Sij	0.441	SE HMp	SE Sij	0.189	SE HBp	SE HMp	SE Sij	0.209	SE HBp	SE HMp	SE Sij	0.158	LSD 1%
0.410	**12.135	0.563	14.677	**5.316	*0.40	14.676	0.571	**10.489	**0.560	14.677	-1.454	0.605	0.23	14.68	10x3