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Analysis of Path Coefficient, Correlations, Variances and Heritability of Genotypes of Maize (*Zea mays* L.)

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Abstract: Studies are being carried out at Karmat Ali, University of Basra's Agricultural Research Station, College of Agriculture which is at 47.80º longitude and 30.57º north latitude, a field experiment was done. In silty loam soil during the spring agricultural season2022, to study the path coefficient analysis, correlations, variances, and the degree of heritability for three genotypes (Al-Maha, IPA-5018, Bhooth-106) of corn crop *Zea mays* L. The experiment was applied according to the method of factorial experiments using randomized complete block design (RCBD) with three replications. The trait of 300 grains weight had the strongest direct positive genetic and phenotypic effect on grain yield, according to the analysis of genetic and phenotypic path coefficients amounted to 0.806 and 0.582, respectively, followed by the characteristic of grains number in corn cob, which had a direct positive genetic and phenotypic effect on grain yield, amounted to 0.164 and 0.308, respectively. The grain yield showed a positive and highly significant genetic and phenotypic correlation with the characteristics of the weight of 300 grains, the number of cobs in plant, and grains number in cob reached (0.912** and 0.934**) (0.479** and 0.815**) (0.846** and 0.897**) for attributes in succession. Variations in grain yield caused by genetic, environmental, and phenotypic factors recorded a variation of 0.1554, 0.00736, and 0.1627, respectively, with a broad-sense heritability average of 95.51%. The heritability average in the broad sense varied according to the different studied traits, and the plant height trait recorded a highest heritability average of 98.74 percent, while protein in grains trait recorded the lowest heritability average in the broad sense, amounting to 68.55%.

Key words:

Introduction

Yellow corn, *Zea mays* L., is regarded as one of the main grain crops. With all of its vegetable and fruit sections, yellow corn serves a variety of purposes as food and fodder for animals, which highlights its significance. Its leaves serve as a foundational component in the paper industry. The best kinds of oils and starch are taken from its grains. It is classified as concentrated fodder because it contains several vitamins, including as B2, B1, and F, as well as 81% carbs, 10.6% protein, 4.6% oil, and 2% ash (Al-Nasrawi,2015). With an average yield of 4.632 tons per hectare, Iraq's farmland will cover 90.522 thousand hectares in 2020 (Directorate of Agricultural Statistics, 2020). A correct understanding of the mechanism of inheritance of crop traits is essential for the management and preparation of systematic breeding programs, especially when dealing with a trait such as grain yield. Therefore, it is necessary to study other traits such as growth traits and yield components by studying some important genetic parameters, including the analysis of path coefficient, variations, and heritability in the broad sense and the genetic and phenotypic correlations through which the possibility of actual planning of breeding and improvement programs for this crop can be achieved (Al-Zubaidy *et al.*, 2018). The information obtained on the direct and indirect effects is based on fragmentation of the correlations between yield and, its components under the influence of agricultural distances. The difference between injustice and the path coefficient, which is an advanced step that determines the minimum characteristics that can be used as an electoral criterion (Muaalla and Hasban, 2011; Waheed *et al.*, 2016),

The selection of genotypes and the evaluation of their performance played a significant role in increasing crop yields of many crops, including the yellow corn crop, and their responses differ depending on the genetic ability of each genotype in the transfer of manufactured foodstuffs from source to downstream. As a result, one trend is the selection of genotypes with high productivity, while the other is after serving the soil and crop to achieve the best possible production. The process of continuous provision of genotypes is accompanied by the adoption of the method of distributing plants in the field, which is one of the important