

Principal component analysis and genetic divergence studies for yield and yield-contributing traits in groundnut (*Arachis hypogaea* L.)

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ABSTRACT

Groundnut is a self-pollinated crop cultivated across diverse agro-climatic regions of world and serves as a source of income and livelihood for millions of farmers. To increase the productivity of groundnut in India, selection and breeding of high yielding cultivars of groundnut is need of the hour. Fifty groundnut genotypes were evaluated at ICRISAT, Hyderabad, during rainy season 2023 using alpha lattice design with three replications. The analysis of variance revealed a significant difference among the genotypes for all the recorded traits. Principal component analysis revealed that the PC1 and PC2 contributed around 80% of total variation in which pod yield/ plot and kernel yield/ plot contributed maximum and is considered as important yield trait for selecting parents in hybridization. In addition, the PCA biplot revealed that there exist positive associations among yield and yield-contributing traits such as pod yield, kernel yield and hundred kernel weight and positive association of hundred kernel weight with shelling percentage. The highest pod yield/ plot and kernel yield/ plot were expressed by the genotype, ICGV 15083 while, the highest shelling percentage was exhibited by JL 24 and hundred kernel weight by ICGV 00440. Cluster analysis the genotypes present in cluster II recorded high mean for pod yield/ plot and kernel yield/ plot while, cluster VIII showed high mean for shelling percentage and cluster I for hundred kernel weight. Therefore, the genotypes identified from PCA analysis and genotypes present in the cluster which recorded high mean values for the yield and yield-contributing traits, can be exploited in groundnut crop improvement programme by selecting them as parents in breeding for high yielding groundnut cultivars.

Keywords: *Cluster analysis, Groundnut, Kernel yield, PCA and Pod yield*