ABSTRACT

Key Words: Variability, Correlation, Path analysis, selection indices and chickpea

The present investigation on “Genetic variability, correlation, path analysis and selection indices in chickpea (Cicer arietinum L.)” was carried out to assess the genetic variability, correlation, path coefficient and selection indices in 30 genotypes of desi chickpea. The study was conducted in randomized block design with three replications at the Instructional Farm, College of Agriculture, Junagadh Agricultural University, Junagadh, during rabi season 2015-16. The observations were recorded on days to 50% flowering, days to maturity, plant height (cm), number of branches per plant, number of pods per plant, first pod bearing node, number of seeds per pod, 100-seed weight (g), seed yield per plant (g), biological yield per plant (g), harvest index (%), seed volume (ml/seed) and number of hard seeds.

The analysis of variance revealed the presence of sufficient variability among the genotypes studied. On the basis of mean and coefficient of range; maximum phenotypic range of variation was observed for seed yield per plant followed by harvest index, number of pods per plant and biological yield per plant. 100-seed weight (g), number of branches per plant and seed volume were noted moderate phenotypic range of variation.

The values of phenotypic coefficient of variation were slightly higher than that of genotypic coefficient of variation for all the traits studied. The high values of GCV and PCV were recorded for seed yield per plant followed by harvest index, number of
pods per plant and biological yield per plant. This indicated the presence of wide
genetic variation for these characters.

High heritability coupled with high genetic advance as per cent of mean was
observed for seed yield per plant, harvest index, number of pods per plant, biological
yield per plant and 100-seed weight suggesting the existence of sufficient heritable
variation and wider scope for effective selection.

The values of genotypic correlation, in general, were higher as compared to
the corresponding phenotypic correlation, indicated that though there was high degree
of association between two variables at genotypic level, its phenotypic expression was
deflated by the influence of environment. The character seed yield per plant was
found to be highly significant and positively correlated with number of pods per plant,
biological yield per plant and harvest index at both the genotypic and phenotypic
levels. Thus, these characters were the most important traits and may contribute
considerably towards higher seed yield. Seed yield per plant also registered positive,
but non-significant correlation with days to 50% flowering, days to maturity, first pod
bearing node, number of seeds per pod, 100-seed weight and seed volume. The yield
components exhibited varying trends of association among themselves.

The genotypic and phenotypic path coefficient analysis revealed that harvest
index and biological yield per plant exhibited high and positive direct effects on seed
yield per plant. While plant height, number of pods per plant and 100-seed weight
exerted low and positive direct effect towards seed yield per plant.

Thirty-one selection indices, involving seed yield and four yield components
characters, were constructed using the discriminant function technique. The efficiency
of selection increased with the inclusion of more number of characters in the index.
The selection index based on five characters viz; seed yield per plant, plant height,
number of pods per plant, biological yield per plant and harvest index possessed
highest genetic gain and relative efficiency. It is expected that seed yield could be
improved if due consideration is given to these traits in future breeding programme of
chickpea.

The final conclusion that can be reached from variability, correlations, path
coefficient analysis and selection indices is seed yield, harvest index, number of pods
per plant, biological yield per plant, 100-seed weight and plant height found the most
important component characters. Hence, these traits should be considered as selection
criteria for yield improvement in chickpea.