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STUDY OF GENETIC PARAMETERS FOR YIELD AND ITS COMPONENT TRAITS IN GERMPLASM OF CHICKPEA (*Cicer arietinum* L.)

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Chickpea serves as a major source of vegetable protein in the daily diet. The average yield of this crop in India is generally low because of drought, susceptibility to diseases and low yield potential of varieties.. Selection on the basis of seed yield is usually not very efficient because its a complex character controlled by a polygenes, but selection based on its component characters having high heritability could be more effective. The variability of a biological population is an outcome of genetic constitution of the individuals' makeup of that population in relation to prevailing environments. A survey of genetic variability with the help of suitable parameters such as genetic coefficient of variation, phenotypic coefficient of variation, heritability and genetic advance are absolutely necessary for the selection of elite genotypes or lines from the germplasm to start an effective breeding programme.

A study of selection criterion was conducted in chickpea using genetic parameters at Research Farm of the Department of Genetics and Plant Breeding, N.D. University of Agric. and Tech. Kumarganj, Faizabad. The experimental material consisted of 104 genotypes with four ideal local cultivars *viz.,* BG 1003, HK 94-134, KWR 108 and BG 256. The trial was sown in an Augmented Block Design comprised of ten blocks. Each plot consisted of single row of 4 m length with 30 cm and 10 cm spacing between and within rows, respectively. All the recommended agronomic and plant protection practices were applied for raising healthy crop stand. The data were recorded for days to50 % flowering, days to maturity, primary branches/plant, secondary branches/plant, plant height (cm), pods/plant, seeds per pod, biological yield/plant (g), harvest index (%), 100-seed weight (g) and seed yield/plant (g). Genotypic and phenotypic variances, genotypic and phenotypic coefficient of variability and broad sense heritability were computed according to the method suggested by (1). Genetic advance in terms of percentage of means was estimated as described by (2).

The results regarding genotypic and phenotypic variance, genotypic and phenotypic coefficient of variability, broad sense heritability and genetic advance expressed as percentage of mean for eleven characters are presented in Table-1. According to Coefficient of variation (%), the seed yield/plant (28.432) was more variable trait followed by pods/plant (26.635), harvest index (24.284), primary branches/plant (18.139), 100-seed weight (16.609) and secondary branches/plant (16.107). these results were showed the more variable trait are very useful to selection of effective genotype under breeding programme. Genotypic and phenotypic variances were high for pods/plant (54.1635 and 64.2044) followed by harvest index with values of 34.4270 and 38.7693, respectively. Genotypic and phenotypic coefficients of variation were high in seed yield plant^{-1} had values of 23.107 and 24.298, respectively. Similar finding was observed by (3). Lowest estimates of genotypic and phenotypic variance were found in seeds per pod with values is 0.0.0165 and 0.0168, respectively. The minimum values of phenotypic and genotypic coefficients of variation were recorded in days to maturity having values of 4.174 and 3.989, respectively. The high heritability (broad sense) was observed for 100-seed weight (99.92) and the minimum for plant height (74.58). Across the among characters, days to 50% flowering, days to maturity, primary branches/plant, secondary branches/plant, pods/plant, seeds per pod, biological yield/plant, harvest index and seed yield/plant showed relatively high heritability values (>70%). In genetic advance as % of mean, their value was minimum observed in days to maturity (7.8536) and days to 50% flowering (12.5307); these value showed less than 15.00% genetic advances as % of men. The maximum value of genetic advance as % of mean was observed in seed

Table-1: Genetic parameters of various yield components of chickpea.

Characters	Range	Mean	Geno-typic variance	Phenotypic variance	Genotypic coefficient of variation	Phenotypic coefficient of variation	h^2	Genetic advance as % of mean
Days to 50% flowering	65.00-90.00	80.94	26.1128	28.1646	6.317	6.561	92.72	12.5307
Days to Maturity	119.00-146.00	133.49	28.2957	30.9826	3.989	4.174	91.33	7.8536
Primary branches/Plant	1.975-3.875	2.79	0.1590	0.2018	14.294	16.102	78.80	26.1390
Secondary branches/Plant	5.095-9.595	6.98	0.8211	0.9739	13.000	14.159	84.31	24.5895
Plant height (cm)	33.789-58.894	43.35	13.5117	18.1164	8.513	9.857	74.58	15.1447
Pods/Plant	18.622-56.923	34.40	54.1635	64.2044	21.394	23.293	84.36	40.4793
Seeds/Pod	0.994-1.594	1.19	0.0165	0.0168	10.812	10.903	98.34	22.0879
Biological yield/Plant (g)	21.396-36.911	28.71	6.5619	7.8537	8.938	9.778	83.55	16.8304
Harvest Index (%)	4.247-13.377	8.66	34.4270	38.7693	19.584	20.782	88.80	38.0164
100-seed weight (g)	13.924-45.536	30.06	10.1198	10.1682	14.620	14.655	99.92	30.0453
Seed yield/Plant	14.025-30.545	21.88	3.9687	4.3884	23.107	24.298	90.44	45.2664

yield/plant (45.2664) followed by pods/plant (40.4793), harvest index (38.0164), 100-seed weight (30.0453), primary branches/plant (26.1390), secondary branches/plant (24.5895), seeds per pod (22.0879), biological yield/plant (16.8304) and plant height (15.1447).

The considerable range of variation recorded in all the traits provides a good opportunity for improving seed yield in chickpea. Maximum variable character was found to be seed yield/plant followed by pods/plant harvest index, primary branches/plant, 100/seed weight and secondary branches/plant. Genotypic and phenotypic variances were highest in pods per plant. In results, the phenotypic variances were larger as compared to genotypic variances for among characters indicating the influence of environmental effect. Genotypic coefficients of variation and phenotypic coefficient of variation were highly estimated in seed yield per plant. Similar results were noted by (3). Knowledge of h^2, genetic advance, PCV and GCV are most important genetic parameters for deciding the scope of improvement through selection. The estimates of heritability coupled with genetic advance are more helpful than those of heritability values alone (4). Broad sense heritability estimates were generally high for all the traits except plant height. High heritability estimates for among characters provides no indication of the amount of genetic progress that would result in selecting the best individual, but heritability estimated along with the genetic advance is more useful (4). High heritability associated with high genetic advance in case of seed yield/plant pods/plant, 100-seed weight, harvest, index, biological yield/plant, seeds per pod, primary and secondary branches/plant indicates that additive gene effects are more important in determining these characters and the improvement can be done through mass selection based on phenotypic values. Similar finding have been reported by (5). In high heritability for days to 50% flowering and days to maturity joint with low genetic advance indicated that these characters were governed by non additive (dominane and epistasis) gene effects. Therefore, there seems a limited scope of improvement in these traits.

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