ASSESSMENT OF CORRELATION AND HERITABILITY FOR PHENOLOGICAL AND MORPHOLOGICAL TRAITS OF CHICKPEA (CICER ARIENTINUM L.)

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ABSTRACT

Chickpea (Cicer arietinum L.) is the second most important grain legume cultivated by resource-poor farmers in the arid and semi-arid regions of the world. The research was evaluated at the field of Pulse Research sub-station, Agriculture Research Institute, Tandojam during the year 2017-2018 to estimate the correlation and heritability for morphological and phenological traits of chickpea (Cicer Triticum L.) genotypes with four replications under Randomized Complete Block Design. Analysis of variance of genotypes, for traits days to 50% flowering, days to 90% maturity, plant height (cm), branches plant-1, pods plant-1, seed index (100 grains wt. g), yield plot-1 (g) and yield hectare-1 (kg) revealed that genotypes are highly significant at 0.01 level for all the parameters. The mean performance exhibited that dwarf plant height check variety DG, 92, While fewer days to 50% flowering, fewer days to maturity, more branches per plant, more pods per plant, higher seed index, greater grain yield per plot, and maximum grain yield per hector in genotype G-305.

INTRODUCTION

Chickpea (Cicer arietinum L.) is grown on low input marginal lands and represents an important component of the subsistence farming. It is the second most important grain legume globally cultivated on an area of 13.20 million hectares (Mha) with an annual production of 11.62 million tons (Mt; FAOSTAT 2011). It is an excellent animal feed. Its straw has also good forage value (Yadav et al., 2016). Among the major chickpea producer countries, India, Pakistan, Turkey, and Iran, most growing areas are classified as arid or semi-arid (Anonymous 2011). Global production of chickpea is recorded to be 13.1 million tons from 13.5 million hectares area, (FAO, 2014).

MATERIAL & METHODS

The experiment was carried out to estimate the correlation and heritability for morphological and phenological traits of chickpea (Cicer aritinum L.) genotypes during the year 2017-2018. The experimental crop was planted in the field of Pulse Research sub-station, Agriculture Research Institute, Tandojam. The experiment was carried out in Randomized Complete Block Design with four replications having a plot size of 7.2m2. Eight chickpea (Cicer aritinum L.) genotypes were sown in a row to row space keeping 30 cm and with a length of row 06m.

Statistical analysis

Data will be statistically analyzed using analysis of variance (ANOVA) according to Gomez and Gomez (1984), correlation coefficients will be determined following the procedures of Raghavrao (1983) and heritability in broad sense will be estimated as suggested by Gardener (1961)

RESULTS & DISCUSSION

The present study was designed in order to analysis correlation and heritability of some quantitative traits of chickpea lines for morphological important traits including days to 50% flowering, days to 90% maturity, plant height (cm), branches plant-1, pods plant-1, seed index (100 grains wt. g), yield plot-1, (g), yield hectare-1 (kg). the chickpea genotypes were evaluated for their mean performance, analysis of variance, correlation, and heritability estimates.

Analysis of variances

The analysis of variance for all the major traits given in the table- 1, The obtained results revealed that the genotypes differ significantly for days to 50% flowering, days to 90% maturity, plant height (cm), branches plant-1, pods

Traits	Mean Square		
	Replications (DF 3)	Genotype (DF 7)	Error (DF 21)
Days to 50% flowering	0.79	4.26 *	1.91
Days to 90% maturity	0.79	4.26 *	1.91
Plant height	1.11	22.42 **	1.28
Branches/plant	0.04	0.49 **	0.02
Pods/plant	2.16	7.42 **	1.59
Seed index	0.05	19.26 **	0.87
Yield plot	10.0	13097.10 **	5.28
Yield hectare	58.10	25258.68 **	10.19

Figure: Mean square from ANOVA for yield and yield contributing traits of chickpea

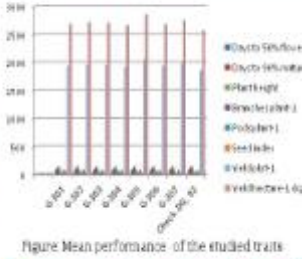

Figure: Mean performance of the studied traits

Traits	Phenotypic variance ($\sigma^2 p$)	Genotypic variance ($\sigma^2 g$)	Heritability (h² b.s%)
Days to 50% flowering	4.75	2.34	49.26
Days to 90% maturity	4.75	2.34	49.26
Plant height	22.74	21.24	92.96
Branches/plant	0.49	0.47	95.91
Pods/plant	7.76	6.92	75.99
Seed index	19.27	19.19	99.58
Yield/plot	13098.42	13093.80	99.94
Yield/hectare	25269.12	25250.50	99.90

Table: Heritability estimates in broad sense (h^2 b. s %)for various qualitative traits in chickpea

Table: Correlations(r) among various traits of chickpea genotypes

CONCLUSION

It was also concluded that chickpea genotypes showed considerable genetic diversity for the majority of the traits studied. These traits also showed positive significant correlation with yield and it was also confirmed through principal component analysis. The clustering of genotypes could help the chickpea breeders to identify and select desired genotypes. These genotypes with economically important traits could be used to combine desired traits in one line with a broad genetic base.

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