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Genetic Parameter Studies for Yield and Quality Traits in Blackgram

Key words : Blackgram, Genetic advance, Heritability.

Blackgram is an important protein rich food legume crop of Indian sub-continent. Keeping in mind the blackgram production targets and protein security to meet the demand of the burgeoning population of the country, development of superior black gram varieties for different niches is an immediate goal of the plant breeders. Since, the efficiency of selection in any plant breeding programmes largely depends on the extent of variability present in the population, estimation of genetic variability in conjuction with heritability and genetic advance gives an idea of the possible improvement of the character through selection. Keeping this in view, the present investigation was undertaken to estimate the genetic parameters such as genotypic coefficient of variation, heritability and genetic advance in fifty two genotypes of blackgram.

The experimental material comprised of fifty two genotypes of blackgram was grown at wetland farm, S.V. Agricultural College, Tirupati during *rabi* 2007-08. The experiment was laid out in randomized block design replicated thrice with 30 x 10 cm spacing. Observations were recorded on days to 50% flowering, days to maturity, SCMR at 30 and 50 DAS, plant height, primary branches per plant, pods per cluster, clusters per plant, pods per plant, seeds per pod, pod length, 100 seed weight, harvest index, total biomass per plant, protein content, reducing sugars and grain yield per plant. Genotypic and phenotypic coefficient of variation (GCV and PCV), heritability, genetic advance as per cent of mean were estimated by formulae given by Lush (1949) and Johnson *et al.* (1955), respectively.

The analysis of variance indicated highly significant differences among genotypes for all the characters studied providing ample scope for improvement of majority of the traits. The mean, range, genotypic and phenotypic variance, genotypic and phenotypic coefficient of variation, heritability, genetic advance and genetic advance as per cent of mean for seventeen characters studied were presented in Table 1. The maximum range of variation was observed for reducing sugars followed by grain yield per plant and harvest index indicating better scope for the genetic improvement of these characters. These results are in conformity with the findings of Revanappa *et al.* (2004) for reducing sugars; Gopikrishnan *et al.* (2002) for grain yield per plant and Anuradha and Krishna Murthy (1993) for harvest index.

High heritability with moderate genetic advance as per cent of mean was recorded for clusters per plant, protein content and primary branches per plant. These traits are most likely controlled by additive gene action.

In the present investigation, high heritability coupled with high genetic advance as per cent of mean was recorded for pods per plant, 100 seed weight, plant height, reducing sugars, grain yield per plant and harvest index suggesting that the genetic variances for these traits are probably owing to their high additive gene effects (Johnson *et al.,* 1955) and thus there is better scope for improvement of these traits through direct selection. This was in conformity with the findings of Natarajan and Rathinaswamy (199) and Gopikrishnan *et al.* (2002).

In conclusion, an overall consideration of the results shows higher estimates of genotypic coefficient of variation, heritability and genetic advance as per cent of mean for plant height, pods per plant, 100 seed weight, harvest index, reducing sugars and grain yield per plant which indicate the predominance of additive gene action in controlling these characters and hence simple directional selection may be effective to improve these traits.

Table 1. Mean, coefficient of variability, heritability (broad sense), genetic advance as per cent of mean for seventeen characters in fifty two blackgram genotypes

Sl. No.	Character	Mean	Range		Variance		Coefficient of variation		Heritability (Broad sense) (%)	Genetic advance (GA)	Genetic advance as per cent of mean (%)
			Mini.	Maxi.	Genotypic	Phenotypic	Genotypic	Phenotypic			
1.	Days to 50% flowering	43.19	41.67	45.00	0.27	0.68	1.19	1.90	39.35	0.67	1.54
2.	Days to maturity	76.14	70.33	79.67	8.03	9.40	3.72	4.03	85.46	5.40	7.09
3.	SCMR at 30 DAS	35.02	31.80	40.30	2.98	3.20	4.93	5.11	93.08	3.43	9.80
4.	SCMR at 50 DAS	40.44	36.03	44.73	3.65	3.97	4.72	4.93	91.96	3.77	9.33
5.	Plant height	37.99	24.12	47.92	35.36	38.31	15.65	16.29	92.30	11.77	30.98
6.	No. of primary branches per plant	6.59	4.38	8.03	0.41	0.52	9.68	10.96	78.04	1.16	17.62
7.	No. of clusters per plant	4.95	3.39	6.33	0.43	0.56	13.25	15.15	76.49	1.18	23.86
8.	No. of pods per cluster	3.46	2.88	3.94	0.05	0.12	6.33	9.85	41.40	0.29	8.40
9.	No. of pods per plant	17.71	12.05	23.16	8.41	8.62	16.37	16.58	97.56	5.90	33.32
10.	Pod length	6.74	5.73	7.43	0.12	0.20	5.13	6.67	59.00	0.55	8.11
11.	No. of seeds per pod	4.98	3.92	5.64	0.08	0.14	5.70	7.58	56.46	0.44	8.82
12.	100 seed weight	16.56	11.08	24.96	9.12	9.85	18.24	18.95	92.58	5.99	36.15
13.	Total biomass per plant	4.15	3.25	4.85	0.10	0.20	7.59	10.71	50.26	0.46	11.09
14.	Harvest index	26.55	15.45	38.13	32.94	40.37	21.62	23.93	81.58	10.68	40.22
15.	Protein content	21.12	17.45	26.39	5.25	6.94	10.85	12.47	75.70	4.11	19.46
16.	Reducing sugars	2.94	0.94	4.23	0.83	0.95	31.11	33.18	87.95	1.77	60.10
17.	Grain yield per plant	4.32	2.55	6.23	0.95	1.09	22.54	24.19	86.81	1.87	43.27

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