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Short Communication

Studies on gene action in a biparental cross in blackgram [*Vigna mungo* (L.) Hepper]

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The genetics of yield is extremely complex and hence one can face difficulties in genetical analysis. This complexity can be judged from the vide array of the type of gene action. Biparental intermating approach has been favoured to elevate the population mean and genetic variability in self pollinated crops like oat, barley and wheat [1]. Hence, the present investigation was aimed to find out the type of gene action for yield and its components through a biparental cross in blackgram [*Vigna mungo* (L.) Hepper].

The study was conducted during rabi seasons of 1993-95 at the Agricultural Research Station, Madhira, Andhra Pradesh. The parents PDU-3 and L-400 were selected for the study on the basis of their phenotypic, genotypic diversity considering their perse performance for yield and its components. The 25 randomly chosen plants (male and females) from F_2 population were intermated following the N.C.II design as suggested by Comstock and Robinson [2]. Thus, 625 progenies were obtained. These progenies were grown in a augmented design during rabi 1993-95. The plot size was single row of 4 m length. The distance between rows was 30 cm and between plants 10 cm. The observations were recorded on ten competitive plants in each progenies for ten characters (Table 1). The data were analysed according to N.C.II design of Comstock and Robinson [2] using plot means.

The analysis of variance (Table 1) indicated significant differences between males for all the traits. Significant mean squares for females were observed for all the traits except days to flowering, days to maturity and plant height. Similarly, sum of squares for F_1 intermated were also significant for all the characters. This indicated that the parents used in the cross were genetically divergent to create highly variables in F_2 and thus giving ample scope for selection.

The progenies exhibited significant variance due to females for days to flowering, clusters per plant, pods per plant, and grain yield, while the variance due to males were significant for only days to flowering. Estimates of variance due to interactions (males × females) was observed for days to maturity, plant height, pods per plant and yield per plant (Table 2).

Additive genetic variance were higher in magnitude than the dominance genetic variances for all the traits except days to flowering, maturity and plant height which showed preponderance of additive genetic variance. Both additive and dominance genetic variances were significant for six characters viz., days to flowering, maturity, plant height, clusters per plant, pods per plant and grain yield per plant. The present findings are in agreement the some of the earlier reports [4-6]. The dominance ratio and average degree of dominance are more than one for all the characters except days to

Table 1. Analysis of variance for N. C. Design II for various characters in biparental intermated progenies in blackgram (PDU-3 × L-400)

Source of variation	d.f.	Days to flowering	Days to maturity	Plant height (cm)	Branches per plant	Clusters per plant	Pods per plant	Seeds per pod	Pod length (cm)	100-seed weight (g)	Yield per plant (g)
Treatments	624	294.05	25.57	18.83	1.64*	23.44	280.27	7.10**	2.75**	0.15**	33.27
Females	24	280.12	85.78	51.46	5.06*	105.98*	361.38**	16.30*	8.06*	9.16**	128.54*
Males	24	263.14*	53.78*	31.16*	2.05**	63.68**	269.05*	6.7-**	2.72**	2.16**	57.91**
Males × Females	576	162.39*	26.40*	17.12*	0.73*	28.28*	235.99*	1.25*	0.73*	0.14**	37.45*
Error	1250	160.05	22.57	13.24	0.60	26.00	232.41	0.46	0.46	0.04	33.87

Table 2. Estimates of variance componets and average degree of dominance for different characters in biparental intermated progenies of blackgram (PDU-3 × L-400)

Characters	Variance due to			Additive component of genetic variance (σ^2 A)	Dominance component of genetic variance (σ^2 D)	Dominance ratio	Average degree of dominance
	Female	Male	Male × Female				
Days to flowering	1.96**	1.68*	0.78	7.85**	13.19**	0.17	0.76
Days to maturity	0.99	0.46	1.29**	3.96**	5.11**	1.17	1.53
Plant height (cm)	0.57	0.23	1.29**	2.30**	5.16**	1.45	1.70
Branches per plant	0.07	0.02	0.04	0.28	1.17	2.28	2.13
Clusters per plant	1.29**	0.60	0.75	5.18**	2.99**	1.19	1.54
Pods per plant	2.09**	0.55	1.20**	8.40**	4.77**	2.80	2.26
Seeds per pod	0.25	0.10	0.26	1.00	1.06	1.76	1.88
Pod length (cm)	0.12	0.03	0.09	0.49	0.36	2.70	2.32
100-seed weight (g)	0.15	0.03	0.03	0.60	0.14	3.46	2.63
Yield per plant (g)	1.52**	0.34	1.23**	6.06**	4.92**	3.47	2.63

flowering suggesting the presence of intrallelic (over dominance) and interallelic intractions governing the expression of these characters and there are possibility of getting transgressive segregants.

In a predominantly self-pollinated crop like blackgram emphasis is to be given to only additive or fixable gene effects as the conventional breeding methods could exploit that portion of genetic variability which is due to additive gene effect or additive × additive gene interactions. The non additive genetic variance cannot, however, be ignored specially in a situation where there is pre-ponderance of non-additive genetic variance. In such situation in blackgram a breeding method that can exploit both additive and non-additive genetic variance would be ideal.

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