recorded in case of pure maize as compared to intercrops. Among intercrops, the value varied as per variation in their yield in respective years. In case of single row and paired rows, water applied was similar and same was the case among intercrops. Therefore, the variation was yield dependent that the quantity of water.

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STUDIES ON COMBINING ABILITY IN BLACK GRAM (Vigna mungo(L) Hepper)

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ABSTRACT

Combining ability was studied in a 6 x 6 diallel set in blackgram (Vigna mungo (L.) Hepper) for seed yield and its seven components. The g.c.a. effects of the parents showed that T9 was a good general combiner for number of pods per plant and seed yield. The crosses Du 1 x ADT 3 and NPRB 2 x KB 70 gave positive significant s.c.a. effects for number of clusters per plant, number of pods per plant and seed yield per plant. These were identified as promising crosses.

The present study was undertaken on an 6 x 6 diallel cross to derive information on general and specific combining ability variances and effects for eight quantitative characters in blackgram (Vigna mungo (L) Hepper).

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MATERIALS AND METHODS

Six varieties namely, DU 1, NPRB 2, NPRB 3, T 9, ADT 3 and KB 70 and their 15 progenies excluding reciprocals were grown in a RBD with three replications at the National Pulses Research Centre, Pudukottai, Tamil Nadu. Each entry was grown in a single row plot of 4 metre length by adopting 30 x 10 cm spacing. Observations were recorded on five randomly selected plants for eight characters viz., plant height, number of primary branches per plant, number of clusters per plant, number of pods per plant, pod length, number of seeds per pod, hundred grain weight and seed yield per plant. The analysis of general and specific combining ability was done according to Method 2 and Model I of Griffing (1956).

RESULT AND DISCUSSION

The results of analysis of variance revealed that there were significant differences among the parents and hybrids for plant height, number of clusters per plant, number of pods per plant and seed yield per plant (Table.1). The gca variance was considerably higher than the sca variance which in turn were also highly significant for plant height, number of clusters per plant, number of pods per plant and seed yield per plant. The GCA/SCA ratio also revealed that the variance due to general combining ability ws high for these characters suggesting there-by that the additive type of gene action would be governing these traits.

The gca effects of parents for different characters are given in Table 2. The results showed that the varieties ADT 3 and KB 70 were the best general combiners for plant height. DU 1 had negative gca effects for plant height. T 9 was observed as the best general combiner for number of pods per plant and seed yield per plant. Thus, the results showed that none of the parents is a good general combiner for all the yield components simultaneously.

The sca effects for different characters are presented in Table 3. The cross NPRB 2 x KB 70 showed significant sca effects for tallness and the crosses NPRB 2 x T 9, NPRB 3 x ADT 3 and NPRB 3 x KB 70 showed significant sca effects for dwarfness. The crosses DU 1 x ADT 3 and NPRB 2 x KB 70 exhibited positive significant sca effects for number of clusters per plant. The crosses DU 1 x ADT 3, NPRB 2 x T 9, NPRB 2 x KB 70 and T 9 x KB 70 gave positive and significant sca effects for number of pods per plant. The crosses DU 1 x ADT 3 and NPRB 2 x KB 70 gave positive significant sca effects for number of clusters per plant,number of pods per plant and seed yield per plant.

It was interesting to note that the crosses which had positive and significant sca effects for seed yield also had positive and significant effects for both number of clusters per plant and numbers of pods per plant. Therefore, it is clear that the number of pods and clusters per plant are the two most important traits through which improvement in seed yield could be effected. Dhaliwal and Singh (1970) and Lal and Waldia (1980) for yield, cluster number and pods per plant and Sagar and Chandra (1977) for yield and pods per plant reported similar findings.

TABLE 1 : Analysis of Combining Ability Variance for Yield and Yield Components in Blackgram.

Source	DF	Plant height	Number of primary branches per plant	Number of clusters per plant	Number of pods per plant	Pod length	Number of seeds per pod	Hundred grain weight	Seed yield per plant
g.c.a.	5	205.38**	0.22	19.31**	356.86**	0.34	0.53	0.58	16.71**
s.c.a.	15	27.09**	0.32	16.99**	167.09**	0.15	0.42	0.05	15.79**
Error	40	11.59	0.24	12.02	33.85	0.06	0.23	5.00	3.30
gca/sca		7.58	0.68	1.13	2.13	2.26	1.26	1.60	1.05

** Significant at 1% level.

TABLE 2 : Estimates of General Combining Ability Effects of the Parents for Different Characters

Parents	Plant height	Number of clusters per plant	Number of pods per plant	Seed yield per plant
DU 1	-8.54**	-0.31	0.29	0.08
NPRB 2	-3.09	-1.85	-1.96	-0.04
NPRB 3	1.76	-1.28	-7.36*	-2.27*
T 9	0.79	1.24	11.82**	2.28
ADT 3	3.90*	-0.11	-4.66	-0.20
KB 70	5.19**	2.32	1.87	0.16
SE	1.70	1.73	2.91	0.91

*, ** Significant at 5% and 1% levels.

TABLE 3 : Estimates of Specific Combining Ability Effects of Crosses for Different Characters in Blackgram

Crosses	Plant height	Number of clusters per plant	Number of pods per plant	Seed yield per plant
DU 1 x NPRB 2	3.66	0.81	1.55	1.63
DU 1 x NPRB 3	2.04	1.98	3.15	1.52
DU 1 x T 9	-3.99	-2.20	-1.37	-2.27
DU 1 x ADT 3	0.57	9.15**	25.17**	7.35**
DU 1 x KB 70	-0.02	-0.29	04.95	0.76
NPRB 2 x NPRB 3	2.22	-3.69	-1.46	0.41
NPRB 2 x T 9	-6.07*	1.99	13.29**	1.25
NPRB 2 x ADT 3	-4.51	-3.99	-13.43**	-3.03*
NPRB 2 x KB 70	4.93*	7.51**	23.91**	8.51**
NPRB 3 x T 9	2.98	1.43	-0.24	1.71
NPRB 3 x ADT 3	-7.37**	0.05	2.10	0.23
NPRB 3 x KB 70	-9.76**	-0.45	1.64	-1.59
T 9 x ADT 3	3.27	1.19	-1.88	1.71
T 9 x KB 70	-4.76	0.56	9.86*	1.42
ADT 3 x KB 70	3.77	1.85	4.99	0.41
S.E.	2.49	2.54	4.26	1.33

*, ** Significant at 5% and 1% levels.

Thus, on the basis of these results, it may be suggested that improvement in all the traits, except yield may be achieved through standard selection procedures. For seed yield, dominance effects have greater influence. Therefore, breeding systems like modified recurrent selection or repeated intermating in segregating generations may help in bringing together all the desirable genes in one genotype and also to take care of the non-additive variance.

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