

Short Communication

Heterosis for yield and yield contributing characters in cowpea [*Vigna unguiculata* (L.) Walp]

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Considerable success has been achieved in the development of high yielding varieties in cross-pollinated crops by the exploitation of heterosis. Comparatively, the efforts to exploit heterosis in most of the self-pollinated crops like cowpea are meager. The data generated for combining ability analysis through line x tester was used to study the heterosis, to ascertain the possibilities of exploiting heterosis for yield in cowpea either for forage or seed yield.

Four genotypes of cowpea, as line were crossed with six testers in line x tester pattern. The 24 hybrids along with 10 parents (4 lines + 6 testers) and standard check (Pusa Komal) were grown in randomized block design with three replications during *Kharif*, 2001. Each treatment consisted of a single row of 4.5 m length accommodating 30 plants in a row with 15 cm distance within the row and 45 cm distance was kept between the rows. The observations were recorded on five randomly selected plants of each genotype per replication for eight quantitative traits *viz*, days to maturity, plant height (cm), number of branches per plant, pod length (cm), number of pods per plant, number of seeds per pod, test weight (g) and grain yield per plant (g). Heterosis over mid parent

(MP), better parent (BP) and standard check (SC) were calculated by following method suggested by Rai (1979).

The range of means for parents and hybrids, range of heterosis over better parent for yield and other component traits are presented in Table 1. Among the females NSP-27 (81.6 days) and among males Konkan Sadabahar (62 days) was the early to mature. Manjarkheda local x Konkan Sadabahar was the early maturing (73.3 days) cross in the hybrids. Among the females Manjarkheda local and among males IC 201097 were taller than others; whereas among the crosses Manjarkheda local x IC 201097 and Manjarkheda local x GC 10 were taller than others. The female Manjarkheda local (8.2) and the male IC 201097 (6.7) recorded more number of branches per plant however, the cross VWB 4 x IC 201081(9.2) was having more branches per plant among the hybrids. The female NSP 27 (28.06) and the male GC 10 (19.4) were having more number of pods per plant and the cross NSP 27 x IC 201097 (26.2) produced more number of pods per plant in hybrids. Among the females Manjarkheda local (39.3 cm) and G1 (15.5 cm) in the males were having more pod length. The cross Manjarkheda local x Konkan Sadabahar (41.46 cm) was

Table 1 : Range of mean and heterosis for yield and yield contributing characters in cowpea

S. No.	Characters	Mean performance							Heterosis over better parent		
		Range			Mean		SEm ±	CD at 5%	Range	SEm ±	CD at 5%
		Females	Males	Hybrids	Parents	Hybrids					
1	Days to maturity	81.6-90.66	62.0-89.0	73.3-89.0	76.93	82.15	0.94	2.65	-16.35-5.53	2.30	4.60
2	Plant height (cm)	80.6-181.1	29.3-62.8	61.3-192.7	75.59	106.24	2.28	6.44	-67.29-6.36	5.59	11.16
3	No. of branches per plant	5.7-8.2	5.3-6.7	4.2-9.2	6.33	6.79	0.36	1.02	-49.19-54.44	0.89	1.78
4	No. of pods per plant	13.5-28.0	12.7-19.4	13.2-26.2	16.55	18.33	0.94	2.66	-52.73-41.47	2.31	4.61
5	Pod length (cm)	13.1-39.3	10.-15.5	13.3-41.4	17.40	22.15	0.46	1.32	-63.38-26.65	1.14	2.29
6	No. of seeds per pod	9.6-13.0	9.3-14.6	10.7-21.53	12.21	15.29	0.61	1.73	-25.11-111.72	1.50	3.0
7	Test weight (g)	6.8-16.9	7.9-13.2	6.6-17.0	11.51	12.85	0.24	0.68	-58.58-7.35	0.59	1.18
8	Seed yield per plant (g)	20.1-28.6	9.3-26.7	14.4-58.3	21.18	33.98	0.97	2.76	-36.55-103.41	2.39	4.78

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having more pod length in the hybrids. The female Manjarkheda local (13.06) and the male IC 201097 (14.6) produced higher number of seeds per pod. The cross VWB 4 x IC 201097 (21.53) produced more number of seeds per pod. Among the females Manjarkheda local (16.9 g) and IC 201097 (13.2 g) in the males were having high test weight but the cross Manjarkheda local x IC 201097 (17.0 g) was having high test weight among the hybrids. The genotype Manjarkheda local (28.6 g) among the female parents and the IC 201097 (26.72 g) among the male parents were having highest seed yield per plant and the crosses Manjarkheda local x Konkan Sadabahar (58.3 g) and Manjarkheda local x G 1 (53.46 g) were

27 x GC 10 gave the significant heterosis over standard check for number of pods per plant. The earlier findings of Bhor *et al.* (1997) and Mehta (2000) were collaborated the present findings.

Heterosis for pod length ranged from -63.38 to 26.65 per cent. The cross NSP 27 x IC 201081 was significantly superior over better parent for pod length. Manjarkheda local x Konkan Sadabahar and Manjarkheda local x IC 201097 recorded significantly high standard heterosis for pod length. In case of number of seeds per pod heterosis ranged from -25.11 to 111.72 per cent over better parent and the combinations VWB 4 x IC 201097 and VWB 4 x IC 201092 recorded the highest magnitude of better parent

Table 2 : List of Best Heterotic Crosses.

S. No.	Character	Better Parent (BP)	Standard Parent (SH)
1	Days to maturity	M.L x K.S, VWB 4 x G 1	M.L. x K.S.
2	Plant height (cm)	M.L x GC 10, M.L x IC 201097	M.L. x GC 10, M.L. x IC 201097
3	Number of branches per plant	VWB 4 x IC 201081	VWB 4 x IC 201081, VWB 4 x IC 201097
4	Number of pods per plant	M.L x K.S., M.L x G 1	NSP 27 x IC 201097, NSP 27 x GC 10
5	Pod length (cm)	NSP 27 x IC 201081	M.L. x K.S., M.L. x IC 201097
6	Number of seeds per pod	VWB 4 x IC 201092, VWB 4 x IC 201097	VWB 4 x IC 201097, VWB 4 x IC 201092, M.L. x K.S.
7	Test weight (g)	NSP 27 x IC 201081	M.L.xIC201097,D.S. x GC 10
8	Seed yield per plant (g)	M.L. x K.S., M.L. x G1 VWB 4 x IC 201097 and Dapoli Safed x GC 10	M.L. x K.S., M.L. x G 1 and VWB 4 x IC 201097

Where; M.L. = Manjarkheda local, K.S. = Konkan Sadabahar

having high seed yield per plant. Heterosis for days to maturity ranged from -16.35 to 5.53 per cent over better parent. The combinations of Manjarkheda local x Konkan Sadabahar and VWB 4 x G 1 recorded significantly high heterobeltiosis for days to maturity. The earlier finding of Bhushana *et al.* (2000) and Mehta (2000) were similar to the results of present findings. In case of plant height heterosis ranged from -67.29 to 6.36 per cent over better parent. The combinations Manjarkheda local x IC 201097 and Manjarkheda local x GC 10 were found significantly superior over better parent for the plant height. The above results were in agreement with the findings of Bhushana *et al.* (1999). For number of branches per plant heterosis ranged from -49.19 to 54.44 and for number of pods per plant -52.73 to 41.47 per cent over better parent. The crosses Manjarkheda local x Konkan Sadabahar and Manjarkheda local x G 1 gave the significant heterosis over better parent while, NSP 27 x IC 201097 and NSP

heterosis. The earlier findings of Sangwan and Lodhi (1995) and Bhushana *et al.* (1999) were confirmed to the present findings. For test weight the heterosis ranged from -58.50 to 7.35 per cent over better parent and the cross NSP 27 x IC 201081 was significantly heterotic over better parent. In case of seed yield per plant heterosis ranged from -36.55 to 103.41 per cent over the better parent. The crosses Manjarkheda local x Konkan Sadabahar, VWB 4 x IC 201097, Dapoli safed x GC 10, Manjarkheda local x G1 showed high percentage of better parent heterosis for seed yield and also exhibited desired heterosis for other characters such as days to maturity, number of branches per plant, pod length, number of pods per plant, number of seeds per pod and test weight. This indicated that heterosis for seed yield seems to be influenced by heterosis for one or more important components of yield. (Patel, 1988 and Bhushana *et al.* 2000).

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