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Heterosis in Indian Bean (*Dolichos lablab* (L.)*

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ABSTRACT

The magnitude of heterosis over better parent was high for seed yield per plant followed by number of pods per plant and number of branches per plant. Significant heterosis effects and high *per se* performance with respect to seed yield per plant was recorded by the cross Red Paria x AKW-9304, Red Paria x NVS-31 and 125-36 x NVS-121. Crosses exhibiting high heterosis for seed yield also depicted high heterosis for one or more yield attributing traits over their better parents.

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INTRODUCTION

The magnitude of heterosis provides a basis for genetic deversity and a guide to the choice of desirable parents for developing superior F_1 hybrids so as to exploit hybrid vigour and/or for building better gene pools to be employed in population improvement. In the recent past, plant breeders have extensively explored and utilised heterosis in boosting up yield in a number of crops. Indian bean is highly self pollinated crop and the scope for exploitation of hybrid vigour will depend on the direction and magnitude of heterosis, biological feasibility and nature of gene action. Study of heterosis will have a direct bearing on the breeding methodology to be employed for varietal improvement. The present investigation was therefore planned to estimate the extent of heterosis over better parent in Indian bean (*Dolichos lablab* (L.)).

MATERIALS AND METHODS

The experimental materials consisted of 79 entries including 4 females, 15 males and their 60 crosses prepared through line x tester mating design by hand emasculation and pollination at Pulses Research Station, Gujarat Agricultural University, Navsari during rabi 1994. They were grown in randomized block design with three replications in single row plots of 3 m length at three locations viz., Navsari, Vyara and Achhalia of Gujarat Agricultural University during rabi 1995-96. Five competitive plants were selected at random at all the three locations from each row to record data on seed yield/plant.

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TABLE 1

Best heterotic crosses for some related parameters for seed yield per plant in Indian bean in pooled analysis.

Sr. No.	Best heterotic hybrids	Heterotic effects (% heterosis)						
		Mean seed yield (g)	No. of branches/ plant	No. of pods/plant	100 seed weight (g)	Days to 50% flowering	Protein content (%)	Days to maturity
1.	Red Paria x AKW-9304	48.59**	14.52**	31.02**	6.18**	9.90**	15.70**	12.13**
2.	Red Paria x NVS-31	47.99**	14.73**	28.20**	-18.3**	-14.53**	-23.42**	-9.63**
3.	Red Paria x NVS-102	41.22**	0.67	34.24**	-4.32**	-4.70**	-11.43**	-2.99**
4.	125-36 x NVS-21	34.60**	6.88**	26.39**	0.50	-6.83**	28.46**	-6.83**
5.	Red Paria x AKW-9305	33.98**	8.49**	11.93**	-9.42**	29.67**	17.01**	22.90**

TABLE 2

Per se performance for some related parameters for seed yield per plant in Indian bean in pooled analysis.

Sr. No.	Best heterotic hybrids	Per se performance						
		Mean seed yield (g)	No. of branches/ plant	No. of pods/plant	100 seed weight (g)	Days to 50% flowering	Protein content (%)	Days to maturity
1.	Red Paria x AKW-9304	49.08	8.36	52.88	24.04	49.33	25.28	95.96
2.	Red Paria x NVS-31	48.88	8.38	51.74	25.29	51.00	19.71	97.00
3.	Red Paria x NVS-102	46.65	7.35	54.18	22.12	54.11	20.87	101.00
4.	125-36 x NVS-21	47.50	8.38	52.97	23.08	54.56	27.72	100.11
5.	Red Paria x AKW-9305	44.26	7.92	45.17	25.34	56.33	25.86	102.56

number of branches/plant, number of pods/ plant, 100-seed weight, pod length, protein content, plant height, days to 50 per cent flowering and days to maturity. Heterosis was estimated as an increase or decrease of F_1 hybrids over their better parents at all the three locations.

RESULTS AND DISCUSSION

The results revealed that in pooled analysis out of sixty hybrids tested thirty one crosses exhibited significant positive heterosis for seed yield per plant, twelve for number of branches per plant, eithteen for number of pods per plant, twenty-one for 100-seed weight, forty-three for protein content and three hybrids for pod length. While twenty-six hybrids depicted significant negative heterobeltiosis for days to 50 per cent flowering, ten hybrids for plant height and twenty-seven for days to maturity, which indicated considerable amount of heterosis. Deorukhkar (1978) in bengal gram, Chaudhary (1993) in cowpea, Reády *et al.* (1994) in mungbean and Pawar (1983) in field bean have also reported significant heterotic effect for one or more characters, which supported the present findings.

Performance of the five most heterotic crosses (Table 1) for seed yield per plant revealed that number of branches per plant were the main contributors towards the seed yield, as all the five crosses depicted highly significant positive heterotic effect for both these characters (except Red Paria x NVS-102 for number of branches). This suggested that heterosis in yield is reflected through heterosis in individual yield component. Grafious (1959) also pointed out that only some components of yield were important for the final product yield. Expression of heterosis for other yield components like pod length and 100-seed weight does not seem to have direct bearing on heterosis for seed yield though yield is a multiplicative interaction of yield components.

A comparison of *per se* performance of crosses and the heterotic effect for seed yield per plant and its important attributes further revealed that there was close association between heterotic effect of the hybrids and their *per se* performance. For example the first five high yielding hybrids were essentially the most heterotic hybrids for seed yield per plant with slight change in their relative ranking. Similar conclusion can be drawn for other components also. It therefore lead to suggest that heterosis over better parent may also be regarded as the reliable guide for breeding better performing hybrids of Indian bean for commercial exploitation.

REFERENCES

Chaudhary, F. P. (1993). Genetic architecture of yield and its components in cowpea (*Vigna unquiculata* (L.)). Unpublished Ph.D. thesis, Gujarat Agril. University, S. K. Nagar.

Deorukhkar, N. V. (1978). Heterosis and combining ability studies in bengalgram (*Cicer arietinum* (L.)). Unpublished M.Sc. thesis, M. P. K. V., Rahuri (M.S.).

Grafious, J. E. (1959). Heterosis in barley. *Agron. J.* **51** (9) : 551-554.

Pawar, A. M. (1983). Heterosis and combining ability studies in field bean (*Lablab purpureus* (L.)). Unpublished M.Sc. thesis K. K. V., Dapoli. (M .S.).

Reddy, M.; Sekhar, K., Raja, Reddy and Raja, C. (1994). Heterosis for yield and yield component in mungbean (*Vigna radiata* (L.)). *Indian J. Genet.* **54** (1) : 1-5.