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HETEROSIS AND INBREEDING DEPRESSION IN SESAME

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ABSTRACT

In a ten-parent diallel of sesame (*Sesamum indicum* L.), 21 cross combinations gave significant heterosis for seed yield. Mean heterosis was high for number of capsules and branches/plant and low for plant height and capsule length. Heterosis for grain yield and its component characters was highly correlated. In general, crosses with significant heterosis also showed significant inbreeding depression in F_2.

Key words: *Sesamum indicum*, sesame, heterosis, diallel cross.

Exploitation of initial hybrid vigour is a potent method to achieve high yielding pure lines. Sesamum is a self pollinated crop and heterosis per se may not be of direct utility. But cross combinations showing low inbreeding depression can be a source of developing high yielding pure lines. Therefore, the present study has been undertaken to evaluate heterosis and inbreeding depression for various morphological traits.

Ten diverse parents, TC-25, T-13, C-50, BMI-2, JT-7, MT 67-25, ES-2, ES-22, Til No.1 and RJS-52, were diallel-mated without reciprocals. The 10 parents, 45 F_1 and 45 F_2 (derived from F_1) were planted in RBD with three replications. Each parent and F_1 was sown in a single row, and each F_2 in four 5 m long rows. The row-to-row and plant-to-plant distances were 40 and 20 cm, respectively. Data on various morphological traits were recorded at maturity. Heterosis over better parent and inbreeding depression were estimated according to the standard procedure.

Significant differences were observed among the parents and crosses for all the characters studied (Table 1). Only 21 cross combinations gave significant and desirable heterosis for seed yield/plant. The percent increase in yield over better parent ranged from 17 (cross C-50 x RJS-52) to 43 (JT-7 x RJS-52) with the average of 11. Among the component characters, highest heterosis was observed for capsules/plant (average 14.49) and branches/plant (average 13.13). These traits were also reported to be positively and

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significantly correlated with seed yield [1]. High magnitude of heterosis for these traits and low heterosis for other traits recorded earlier [2] provide support to the results of this study.

The highest inbreeding depression was recorded for capsules/plant, followed by seed yield and number of branches/plant, whereas it was low for the remaining characters. This suggests the importance of nonadditive gene action governing seed yield in sesamum, as was also observed earlier [3].

The crosses showing high positive heterosis (Table 1) also exhibited positive and significant inbreeding depression for grain yield. Further, high heterosis for yield was accompanied by high heterosis for most of the morphological characters.

Table 1. Heterosis (H) and inbreeding depression (I) for various characters in the best five crosses in sesamum

Cross	Parameter	Heterosis and inbreeding depression, %					
		seed yield per plant	days to flowering	plant height	capsule bearing length	branches per plant	capsules per plant
JT-7 X RJS-52	H	43**	6*	0	12	42*	48**
	I	9*	–3	9	14*	16	16
BMI-2 X JT-7	H	42**	0	15**	14	52**	55**
	I	38**	–8**	18**	28*	18	37**
ES-22 X Til No.1	H	40**	–5	11*	23**	26*	26**
	I	52**	–17**	23**	30**	30	48**
BMI-2 X ES-2	H	38**	8*	1	10	50**	44**
	I	49**	0	24**	25**	42**	49**
Til No. 1 X RJS-52	H	36**	8	–7	1	73**	29**
	I	16**	–8**	4	8	39**	26**
SE_d	H	0.74	0.92	4.69	4.46	0.38	3.47
	I	0.74	0.94	5.67	0.64	0.43	3.85

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

It would thus seem possible to achieve yield improvement in this crop by improving any or a number of specific component characters.

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