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A PRELIMINARY STUDY ON HETEROTIC POTENTIAL IN SESAME (*Sesamum indicum* L.)

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Thirty Six hybrids derived by crossing 12 female and three male parents Sesamum were studied for heterosis The extent of heterosis was found to be high for number of capsules and seed yield. The gca values were high in N-62-34/3 and JT 62-34/1 among females and in Co-1 among males. In respect of sca values the combination N 62-34/3 X Co-1 was superior.

Sesame is an important oilseed crop The seed yield in this crop, however, could not be increased over 400 kg/ha under rainfed conditions. Since the floral architecture of the crop with epipetalous stamens can facilitate swift emasculation and cross pollination, the possibility of evolving hybrid sesame is worth exploring. With this view in mind, a preliminary study was made on the extent of heterotic potential in this crop and is reported herein.

MATERIAL AND METHODS

Single plant observations on 36 hybrids derived between 12 female and three male parents were recorded during Kharif, 1982 in the experimental fields of the Tamil Nadu Agricultural University, Coimbatore. The characters plant height, number of braches, number of capsules and seed yield were measured. The extent of heterosis over the superior parent Co-1 was worked out. The gca and sca effects were also computed as suggested by Kempthorne (1957).

RESULTS AND DISCUSSION

The character expression for the 36 hybrids studied are presented in Table-2. The extent of heterosis and combining ability effects for each of the characters studied are as follows:-

i) *Plant height*: Fifteen cross Combination out of 36 studied exhibited heterosis over the superior parent Co-1 for this trait. The extent of heterosis was appreciable (Table-1) in the combinations N 62-34/3 x Co-1 (20%), A-6-5-1 x Co-1 (20%), A-6-5-3 x TMV 4 (21%) and A-6-5-1 x TMV 6 (17%). The gca effects were high for A-6-5-3, SI; 1871 and N 62-34/3 among the female parents and among the males, Co-1 exhibited the highest gca (Table 2). In respect of specific combining ability potential the combinations A-6-5 1 x TMV 6, JT 66-135/6 x TMV 4 and JT 62-32/1 x Co-1 were superior.

ii) *Number of branches*: Only one combination, viz., JT 66-135/6 x TMV 4 exhibited heterosis (25%) ovar the standard Co-1 for this trait (Table 1). The gca effects were high for SI 1871 and JT 66-135/6 among the females and for Co-1 among the males (Table 2). In respect of sca effects the combination A 6-5-3 xCo-1 and An and 74/2x TMV 6 were superior (Table3)

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iii) *Number of capsules*: Twelve combinations exhibited heterosis over Co-1. The extent of heterosis was appreciable in JT 66 135/2 x Co-1 (185)%), N 62-34/3 x Co-1 (149) and JT 66-135/6 x TMV 4 (118%). The gca values were high for N 62-34/3 and SI 1871 among the females and for Co-1among the males (Table 2) The sca values were high in JT 6-135/2 x Co-1, JT 66-135/6 x TMV 4 and JT 62-34/1 x TMV 6 (Table 3).

iv) *Seed yield*: Nine combinations exhibited heterosis over Co-1, The extent of heterosis (Table-1) was high in N62-34/3 Co 1 (333%), N 62-34/3 x TMV 4 (100%) and A-6-5 1 x Co-1 (67%). The gca values were high for N 62-34/3 and JT 62-34/1 among females and for Co-1 among the males (Table-2). In respect of sca values, the cobinations N 62-34/3 x Co-1 and JT 62-34/1 x TMV 6 were superior.

To conclude, the extent of heterosis was high for seed yield and number of capsules. Similar observations have been made by Paramasivam *et. al.* (1982), Tilak Raj Gupta (1980) and Murthy (1975) in this crop. In the present study, the varieties Co-1 and N-62-34/3 were found to possess general combining ability potential for the four characters studied. The hybrid involving these two parents besides showing high specific combining ability potential expressed increased values over the best parent Co-1. This combination is worthy of commercial exploitations of heterosis. Selection of superior recombinants out of this cross by pedigree method will also yield fruitful results as the parents exhibit high gca

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Table 1 Increased character expression observed in 36 hybrid combinations in Sesame

Females	Males											
	Plant height (cm)			Branches (No.)			Capsules (No.)			Seed Yield (g)		
	Co-1	TMV-4	TMV-6	Co-1	TMV-4	TMV-6	Co-1	TMV-4	TMV-6	Co-1	TMV-4	TMV-9 6
SI 1142	84 (4)	85 (5)	76	3	5	4	62	98 (11)	52	4	1	1
JT 66-135/2	84 (4)	55	64	6	2	2	254 (185)	30	48	8 (33)	3	3
JT 66-135/4	61	58	56	2	2	2	88	49	49	2	5	7 (17)
JT 66-135/6	84 (4)	91 (21)	71	5	8 (25)	4	58	194 (118)	78	5	9 (50)	5
JT 62-34/1	84 (4)	60	51	6	4	4	99 (11)	66	155 (74)	8 (33)	5	15 (150)
N 62-34/3	97 (20)	78	80	6	4	6	222 (149)	156 (75)	87	26 (333)	12 (100)	7 (17)
SI 1871	94 (16)	84 (4)	78	6	6	6	163 (83)	181 (103)	99 (11)	6	3	7 (17)
A-6-5-1	97 (20)	57	95 (17)	5	4	6	136 (53)	68	123 (38)	10 (67)	3	6
A-6-5-2	91 (12)	84 (4)	74	4	5	3	127 (43)	71	46	4	3	2
A-6-5-3	91 (12)	98 (21)	94 (16)	6	4	4	155 (74)	85	80	2	1	1
Anand 74/2	80	65	68	4	4	6	87	72	118	4	6	5
Type 12/1	68	58	61	3	3	4	35	64	48	4	4	2

Values in parentheses indicate heterotic values over standard Co-1.

Table 2 General combining ability potential

Source	Gca values			
	Plant height	No. of branches	No. of capsules	Seed yield
Females				
SI 1142	5.1	—0.4	—29.4	—3.5
JT 66—135/2	—8.9	—1.1	10.6	—1.9
JT 66—135/4	—20.3	—2.4	—38.1	—0.8
JT 66—135/6	5.4	1.4	9.9	0.8
JT 62-34/1	—11.6	0.3	6.6	3.8
N 62-34/3	8.4	0.9	54.9	9.5
SI 1871	8.7	1.6	47.6	—0.2
A-6-5-1	6.4	0.6	8.9	0.8
A-6-5-2	6.4	—0.4	—18.8	—2.5
A-6-5-3	17.7	—0.7	6.6	—4.2
Anand 74/2	—5.6	—0.7	—7.8	—0.5
Type 12/1	—14.3	—1.1	—51.1	—2.2
Males				
Co 1	8.0	0.3	23.7	1.4
TMV-4	—3.8	—0.1	—5.6	—0.9
TMV-6	—4.3	—0.1	—18.2	—0.4

Table : 3 Specific combining ability potential in 12 x 3 cross combinations in Sesame

Females	Males											
	Plant heigt			Branches			Capusles			Seed yield		
	Co 1	TMV 4	TMV 6	Co 1	TMV 4	TMV 6	Co 1	TMV 4	TMV 6	Co 1	TMV 4	TMV 6
SI 1142	—5.7	7.1	—1.4	—1.3	—0.9	0.1	—32.4	32.9	—0.5	0.6	—0.1	—0.6
JT 66-135/2	8.3	—3.9	0.6	2.4	—1.2	—1.2	—119.6	—75.1	—44.5	1.9	0.8	—1.3
JT 66-135/4	—5.3	3.5	1.7	—0.3	0.1	0.1	2.3	—7.4	6.2	—4.1	1.2	1.7
JT 66-135/6	—6.0	17.8	6.7	—1.0	—1.1	—1.6	—75.7	89.6	—13.8	—0.7	3.1	1.1
JT 62-34/1	11.0	—1.2	—9.7	—2.6	—0.6	—0.6	—31.4	—35.1	66.5	—2.7	—3.4	6.1
N 62-34/3	4.0	—3.2	0.7	—1.0	—1.2	0.8	43.3	6.6	—49.8	15.1	—2.1	—7.6
SI 1871	0.7	2.5	—3.0	—0.3	0.1	—0.1	—8.4	38.9	30.5	—0.7	—1.4	2.1
A-6-5-1	6.0	—22.2	16.6	—0.3	—0.9	1.1	3.3	—39.4	32.2	2.3	—2.4	0.1
A-6-5-2	0.0	4.8	—4.7	—0.3	1.1	—0.9	22.6	—4.7	—17.1	—0.4	0.9	—0.6
A-6-5-3	—11.3	7.5	4.0	2.0	0.4	0.4	14.6	—16.1	—8.5	—0.7	0.6	0.1
Anand 74/2	1.0	—2.2	1.3	0.0	—0.2	2.1	24.6	—14.7	43.9	—2.4	1.9	—0.6
Type 12/1	—2.3	—0.5	3.0	—0.6	—0.3	—0.8	37.7	20.6	17.2	—0.7	1.6	—0.4