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Short Communication

Studies on Heterosis in Sesame (*Sesamum indicum* L.)

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Eight parents of different geographical origin *viz.*, Co1, VRI1, TMV3, SI3216, YLM123, SI42, SVPR1, and AHT123 of sesame (*Sesamum indicum* L.) genotypes were crossed in a half diallel fashion during *kharif*, 2000 to obtain 28 hybrid combinations. These 28 F_1 hybrids along with their eight parents were sown in randomized block design with three replications during Rabi, 2000. Each entry was raised in a row of 3m length and spaced 30 cm apart. Plant to plant distance within row was 30 cm. Ten plants in each replication at the middle of the row were selected at random in each genotype and observations were recorded on yield and other yield related characters. The extent of heterosis over mid-parent, better parent and standard parent (Co1) were estimated.

The range of three types of heterosis and number of hybrids having positive heterosis are given in Table 1. Six crosses showed earlier flowering than the standard variety, Co1. The hybrid, SI3216 × SVPR1 showed very early flowering.

Four crosses showed more height than the standard variety, Co1 and the cross, Co1 × YLM123

Table 1. Range of Heterosis for yield and its contributing traits in sesame

Sl. No.	Character	Relative heterosis			Heterobeltiosis			Standard heterosis		
		Range	No. of crosses superior to mid parent	Best cross	Range	No. of crosses superior to better parent	Best cross	Range	No. of crosses superior to standard parent	Best cross
1.	Days to 50 percent flowering	–5.94 to – 5.36	7	VRI1× SI3216	– 2.88 to 10.28	-	SI3216× SVPR1	–7.32 to 11.95	6	SI3216× SVPR1
2.	Plant height	– 6.18 to 31.11	19	Co1× YLM123	– 10.02 to 22.24	12	VRI1× AHT123	–22.56 to 18.40	4	Co1× TMV3
3.	Number of primary branches per plant	30.14 to 96.75	15	YLM123× AHT123	– 40.16 to 92.51	9	YLM123× AHT123	– 40.19 to 39.23	3	Co1× YLM123
4.	Number of capsules per plant	–9.17 to 90.86	18	YLM123× AHT123	–16.37 to 84.97	18	YLM123× AHT123	–9.22 to 85.02	18	SI42× SVPR1
5.	Number of seeds per capsule	– 8.14 to 60.56	12	YLM123× AHT123	– 16.85 to 59.34	10	YLM123× AHT123	– 9.95 to 41.79	12	YLM123× AHT123
6.	1000 seed weight	– 29.87 to 42.72	7	Co1× SI3216	– 29.87 to 35.30	4	Co1× SI3216	–8.15 to 58.80	14	YLM123× SI42
7.	Oil content	– 16.18 to 0.13	-	SI42× AHT123	–20.08 to 0.01	-	SI42× AHT123	– 11.89 to 5.16	-	SI42× AHT123
8.	Photosynthetic rate	–27.89 to 73.55	15	TMV3× AHT123	– 33.13 to 65.47	14	TMV3× AHT123	– 34.59 to 50.26	11	SI3216× YLM123
9.	Leaf area index	– 12.04 to 39.65	23	SI3216× YLM123	– 15.79 to 32.93	22	SI3216× YLM123	–9.63 to 35.32	23	SI3216× YLM123
10.	Chlorophyll content	–19.62 to 47.43	22	Co1× SI42	–24.87 to 43.57	21	TMV3× AHT123	–14.96 to 59.84	25	VRI1× SI3216
11.	Harvest index	–40.65 to 48.51	18	SVPR1× AHT123	–46.25 to 37.09	15	SVPR1× AHT123	–33.56 to 34.48	16	TMV3× AHT123
12.	Single plant yield	–22.32 to 151.46	22	YLM123× AHT123	–34 09 to 140.14	19	SI3216× YLM123	–33.48 to 102.06	18	YLM123× AHT123

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was the tallest. The YLM123 × AHT123 recorded maximum number of primary branches per plant and number of capsules per plant. Jayaprakash and Siva subramanian [1] reported positive heterosis for the above traits.

Table 2. Hybrids for heterosis breeding in sesame

Sl. No.	Character	Hybrids with superior mean, *sca* effect and standard heterosis
1.	Days to 50 percent flowering	SI3216 × YLM123
2.	Plant height	Co1 × VRI1, Co1 × SI3216 Co1 × YLM123, VRI1 × AHT123
3.	Number of primary branches per plant	VRI1 × AHT123, YLM123 × AHT123
4.	Number of capsules per plant	Co1 × VRI1, Co1 × SI3216, Co1 × YLM123, VRI1 × TMV3, VRI1 × AHT123, TMV3 × SI3216, SI3216 × YLM123, YLM123 × SI42, YLM123 × AHT123, SI42 × AHT123
5.	Number of seeds per capsule	VRI1 × TMV3, VRI1 × AHT123, SI3216 × YLM123, YLM123 × AHT123, SI42 × AHT123
6.	1000 seed weight	Co1 × SI3216, VRI1 × AHT123, YLM123 × SI42, YLM123 × AHT123, SI42 × AHT123
7.	Oil content	-
8.	Photosynthetic rate	Co1 × VRI1, TMV3 × SI3216, SI3216 × YLM123, YLM123 × SI42, YLM123 × AHT123, SI42 × AHT123
9.	Leaf area index	SI3216 × YLM123
10.	Chlorophyll content	Co1 × VRI1, Co1 × SI3216, Co1 × YLM123, VRI1 × YLM123, TMV3 × SI3216, YLM123 × SI42, YLM123 × AHT123, SI42 × AHT123
11.	Harvest index	Co1 × VRI1, Co1 × SI3216, Co1 × YLM123, VRI1 × AHT123, TVM3 × SI3216, SI3216 × YLM123, YLM123 × AHT123, YLM123 × SI42
12.	Single plant yield	Co1 × VRI1, Co1 × SI3216, Co1 × YLM123, VRI1 × TMV3, VRI1 × YLM123, VRI1 × AHT123, TMV3 × SI3216, SI3216 × YLM123, YLM123 × SI42, YLM123 × AHT123, SI42 × AHT123
	Overall performance	YLM123 × AHT123, YLM123 × SI42, SI42 × AHT123, VRI1 × AHT123, TMV3 × SI3216, Co1 × VRI1, Co1 × SI3216, SI3216 × YLM123

Capsules with more number of seeds were also produced by the cross, YLM123 × AHT123 and 12 crosses exceeded the value of Co1. Vignesh [2] quoted similar results for the trait. Fourteen crosses had more 1000 seed weight than the standard variety, Co1. The hybrid, YLM123 × SI42 recorded the maximum 1000 seed weight. Similar results were also obtained by Kavitha *et al.*, [3]. None of the cross was superior over standard variety, Co1 for oil content.

Twenty three crosses exceeded the value of Co1 for the leaf area index. The maximum leaf area index was recorded by hybrid, SI3216 × YLM123 (Table 2). Similar results were quoted by Ananda Kumar [4]. Eleven crosses had more photosynthetic rate over standard variety, Co1. The hybrid, TMV3 × AHT123 had the maximum photosynthetic rate. The cross, VRI1 × SI3216 recorded the maximum chlorophyll content. Sixteen crosses exceeded the value of Co1 for harvest index. The maximum harvest index was recorded by the hybrid, SVPR1 × AHT123.

The range of heterosis for single plant yield varied from - 34.09 to 151.46 with 18 crosses exceeding the value of Co1. The hybrid, YLM123 × AHT123 recorded the maximum seed yield.

Kadambavana Sundaram [5] suggested that heterotic expression over standard variety should be given due importance for exploitation of commercial hybrid. Six hybrids namely VRI1 × AHT123, SI3216 × YLM123, SI3216 × SI42, YLM123 × AHT123, Co1 × VRI1 and Co1 × SI42 were identified as best since they expressed high standard heterosis over the standard variety for several yield components (Table 2).

Based on high *per se*, high *sca* and high heterosis, the cross YLM123 × AHT123 had been identified as superior followed by YLM123 × SI42, VRI1 × AHT123, SI42 × AHT123, SI3216 × YLM123, Co1 × SI3216, Co1 × VRI1 and TMV3 × SI3216 and these crosses can be effectively used for heterosis breeding.

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