Madras Agric. J.77, (9-12): 401-405 (1990)

https://doi.org/10.29321/MAJ.10.A01976

PER SE PERFORMANCE OF PARENTS AND HYBRIDS IN SESAME

N. ANITHA and M. STEPHEN DORAIRAJ
School of Genetics, Tamil Nadu Agricultural University,
Coimbatore - 641 003.

ABSTRACT

Per se performance of eight sesame genotypes and the resultant 56 hybrids when crossed in diallel fashion was studied for 20 characters. Maximum seed yield per plant was recorded by TSS 4 (14.97 g) among the parents and Si 1125 x TSS 4 (15.53 g) among the hybrids. The parents TSS 4, TSS 5 and Co 1 with high seed yield also recorded high values for many other yield components. The best yielding hybrids which recorded high mean values for yield components were Si 1125 x TSS 4, Co 1 x Si 1003, TSS 4 x TSS 5, TSS 5 x TSS 4 and TSS 4 x Co 1.

KEY WORDS : Sesame, *Per se* performance.

The success of any crop breeding programme depends upon the choice of the parents based on *per se* performance, besides other criteria such as genetic divergence, combining ability etc., and employing the selected genotypes either for exploitation of heterosis, if the crop is amenable for the same, or for recombination breeding. Parents with a good *per se* performance are expected to yield desirable recombinants in the segregating generations and the potentiality of such genotypes will also reflect in the performance of the hybrids with a view to study the performance of certain selected genotypes and the resultant F_1 hybrids in sesame, a study was undertaken and the results on the mean performance of the parents and hybrids are presented.

MATERIALS AND METHODS

Eight sesame varieties viz., Co1, TSS 5, TSS 4, Si 1502, Si 1484, Si 1003, Si 1248 and Si 1125 were selected out of 50 genotypes subjected to detailed studies on variability, character association and genetic divergence by Reddy (1986). They were crossed in diallel fashion and the resultant 56 hybrids along with parents were raised in randomised block design with three replications. Five plants for each genotype from each replication were selected at random for recording observations on 20 metric traits. The data were subjected to analysis of variance to assess whether the treatment differences are significant for the various traits.

RESULTS AND DISCUSSION

Analysis of variance revealed that the treatment differences between the genotypes (parents and hybrids) were significant for all the characters except for plant height and 1000 seed weight.

The mean performance of the parents and hybrids for the twenty characters under study is presented in Table 1.

Crop duration in the parents ranged from 83.33 days to 90.67 days, SI 1003 being the earliest and TSS 4 being very late. Among the hybrids, Co 1 x SI 1502 was the shortest in duration (82.67 days), while TSS 4 x SI 1248 was the longest (90.00 days). Leaf area index ranged from 1.13 in SI 1003 to 1.74 in TSS 4 among the parents and 0.54 in Si 1502 x TSS 4 to 2.18 in Si 1003 x Si 1125 among the hybrids.

When we consider the total number of capsules on the main stem, primary branches and secondary branches together, it was observed that among the parents, TSS 4 recorded maximum of 133.86 capsules per plant, while Si 1484

Table 1. Mean performance of the parents and hybrids.

S.No	Parent	No.of days to 50 per cent flowering	No.of days to maturity	Leaf area Index	Plant height (cm)	No.of prim-aries	No.of secon-daries	First capsule bearing node	No.of capsules on			No.of capsule bearing nodes to total no. of nodes on			Volume of the capsule (cm^3)	Number of seeds per capsule	1000 -seed weight (g)	Seed yield per plant (g)	Total DMP (g)	Harvest index (per cent)	Oil content (Per cent)
									Main stem	Prima-ries	Secon-daries	main stem (per cent)	Prima-ries (per cent)	Secon-daries (per cent)							
	Parents																				
1.	Co 1	43.67	85.83	1.72	104.33	4.93	4.40	6.47	27.00	54.13	24.73	70.20	70.45	63.75	1.16	67.67	3.24	11.81	76.94	15.39	41.13
2.	TSS 5	43.33	88.67	1.37	101.40	5.53	4.60	5.73	28.60	59.20	27.40	58.30	71.45	52.13	1.15	61.75	3.20	12.55	67.03	18.78	42.38
3.	TSS 4	44.00	90.67	1.74	96.93	6.27	5.73	7.07	25.13	78.53	30.20	50.73	77.17	90.03	1.09	60.90	3.17	14.97	80.00	18.83	42.83
4.	SI 1502	37.67	84.67	1.32	97.47	5.73	4.53	5.53	28.13	66.27	25.67	65.15	78.69	79.46	1.20	65.13	3.28	9.40	63.36	14.75	42.12
5.	SI 1484	38.33	86.67	1.32	98.27	4.53	3.93	5.40	22.00	49.80	18.73	61.15	71.39	66.87	1.28	62.85	3.12	6.83	70.94	9.61	40.28
6.	SI 1003	44.33	83.33	1.13	103.60	5.13	7.73	5.53	20.47	56.07	26.80	52.45	71.16	74.87	1.06	73.35	2.89	5.89	56.94	10.28	40.50
7.	SI 1248	37.67	84.33	1.19	99.47	4.73	5.37	7.87	24.53	64.20	20.87	53.14	69.49	49.02	1.36	67.35	2.88	10.09	62.93	15.93	40.55
8.	SI 1125	41.35	85.33	1.47	111.20	5.67	6.20	5.40	17.40	48.60	25.67	43.51	52.93	63.14	1.19	61.26	3.43	8.51	76.47	11.34	41.70
	Hybrids																				
	Co 1 X																				
9.	TSS 5	40.00	85.67	0.81	113.20	5.13	5.20	6.80	25.07	66.93	29.13	58.22	75.33	69.53	1.25	69.25	3.09	11.45	66.91	17.15	42.23
10.	TSS 4	42.00	85.67	1.36	99.27	5.00	5.40	5.47	25.27	61.20	19.60	65.15	69.15	63.11	1.29	64.26	2.90	7.54	63.95	11.77	40.57
11.	SI 1502	37.33	82.67	0.71	104.47	3.67	3.40	5.27	27.07	74.47	19.07	66.12	76.95	65.52	1.52	63.34	3.30	10.66	66.09	16.20	40.68
12.	SI 1484	39.33	85.00	0.09	105.53	4.93	4.60	5.73	27.33	73.80	20.73	66.43	81.25	56.62	1.63	72.47	3.08	11.86	67.53	17.84	40.62
13.	SI 1003	39.33	86.00	1.28	106.47	5.07	5.47	5.73	24.47	82.40	27.20	53.21	80.52	84.46	1.52	72.16	3.24	14.59	85.69	17.37	41.60
14.	SI 1248	41.00	85.00	0.95	102.80	5.53	6.60	5.87	25.67	75.73	36.80	60.22	83.06	63.56	1.14	65.07	3.00	11.47	74.02	15.36	41.85
15.	SI 1125	39.33	86.00	0.89	97.53	5.47	5.00	7.13	24.60	55.40	19.27	68.63	72.41	65.52	1.21	62.09	3.20	9.84	68.00	14.38	40.45
	TSS 5 X																				
16.	CO 1	40.67	85.67	1.98	100.40	5.87	5.20	5.87	29.20	77.33	29.47	76.91	83.70	66.92	1.35	67.16	2.99	11.62	72.96	16.11	41.48
17.	TSS 4	42.33	86.33	1.65	119.00	5.87	6.13	5.53	28.20	74.47	27.53	67.40	78.35	67.41	1.19	66.03	3.23	14.35	73.23	19.50	41.92
18.	SI 1502	41.00	85.00	1.07	97.87	4.87	6.13	5.80	25.03	73.00	31.73	54.70	81.52	70.98	1.02	62.47	3.13	11.33	63.94	17.47	41.62
19.	SI 1484	39.33	85.33	1.65	108.33	5.07	4.13	6.20	26.40	69.00	18.47	55.85	74.34	62.90	1.59	71.51	3.05	10.84	64.79	16.96	40.88
20.	SI 1003	42.67	88.00	2.15	106.07	4.60	8.07	5.93	31.00	83.80	34.87	70.66	83.87	81.76	1.41	66.29	3.31	11.94	92.89	12.93	42.02
21.	SI 1248	40.00	89.67	0.86	104.07	4.67	5.53	5.93	26.07	75.20	30.27	62.79	77.70	73.47	1.50	71.60	3.02	10.91	69.87	15.68	41.32
22.	SI 1125	43.00	85.33	1.84	101.53	5.67	6.13	7.13	27.00	55.40	28.00	60.30	74.15	78.96	1.08	66.70	3.05	13.03	71.96	18.16	41.28
	TSS4 X																				
23.	CO 1	41.67	86.00	1.02	105.53	5.07	4.87	8.13	24.13	84.73	36.07	56.77	83.13	91.16	1.28	75.67	3.27	13.59	66.77	20.38	41.59
24.	TSS 5	43.33	84.67	1.49	96.07	6.13	7.13	5.93	25.33	87.60	29.53			76.82	1.24	65.36	3.42	14.39	68.64	20.94	42.85

S.No	Parent	No.of days to 50 per cent flowering	No.of days to maturity	Leaf area index	Plant height (cm)	No.of primaries	No.of secondaries	First capsule bearing node	No.of capsules on			nodes to total no. of nodes on			Volume of the capsule (cm^3)	Number of seeds per capsule	1000 -seed weight (g)	Seed yield per plant (g)	Total DMP (g)	Harvest Index (per cent)	Oil content (Per cent)
									Main stem	Primaries	Secondaries	main stem (per cent)	Primaries (per cent)	Secondaries (per cent)							
25.	SI 1502	41.67	87.00	1.21	104.67	5.00	5.67	5.53	26.33	55.87	24.13	63.16	61.08	81.13	1.52	74.48	3.08	10.61	74.39	14.39	41.38
26.	SI 1484	41.67	86.67	1.23	109.73	4.80	4.73	5.87	29.93	73.33	29.93	52.54	76.79	65.28	1.36	74.86	3.07	9.37	76.93	12.44	41.05
27.	SI 1003	41.67	86.00	1.24	109.80	5.47	6.00	5.47	24.13	64.00	29.00	51.92	75.80	69.47	1.20	70.82	3.28	13.06	73.74	17.92	42.42
28.	SI 1248	42.00	90.00	0.92	94.87	5.07	5.53	6.47	27.67	63.13	39.80	67.66	78.46	88.47	1.01	73.31	2.97	11.36	70.71	15.96	42.83
29.	SI 1125	40.67	86.00	1.76	105.53	5.07	3.53	6.20	26.20	66.53	26.13	58.31	86.29	67.27	1.40	70.69	3.05	11.22	63.22	17.64	42.15
	SI 1502 X																				
30.	CO 1	35.67	83.33	1.11	107.33	3.87	4.13	6.07	24.87	50.33	24.53	51.72	55.83	82.34	1.54	74.78	3.21	10.88	69.62	15.74	40.67
31.	TSS 5	37.00	85.00	1.29	99.40	4.47	5.00	5.53	28.87	56.93	22.33	59.83	62.76	90.26	1.24	76.02	3.33	9.49	64.95	14.72	40.98
32.	TSS 4	40.00	85.33	0.54	107.07	4.73	3.87	5.87	24.67	71.27	23.93	55.87	67.07	53.91	1.51	66.14	3.09	10.91	66.58	16.18	41.60
33.	SI 1484	34.33	83.33	1.64	102.40	3.27	3.07	4.93	24.73	39.53	19.53	72.06	75.47	53.16	1.34	78.90	2.87	9.55	66.56	14.32	39.60
34.	SI 1003	39.67	85.33	1.22	110.73	5.40	4.60	6.53	27.60	62.67	24.93	68.60	79.60	77.55	1.60	75.10	2.98	8.69	68.92	12.61	39.65
35.	SI 1248	36.00	84.33	1.23	98.93	3.53	4.93	5.87	26.67	49.00	22.93	62.44	61.29	81.29	1.37	78.17	2.87	10.72	72.18	14.95	40.80
36.	SI 1125	38.33	86.00	1.27	109.07	4.73	3.93	6.13	22.13	46.67	20.00	55.83	52.66	64.34	0.99	69.50	2.72	10.43	71.12	14.70	40.96
	SI 1484 X																				
37.	CO 1	39.67	84.67	1.66	109.47	4.27	4.27	5.73	25.93	57.00	15.07	60.44	69.04	59.86	1.19	65.12	3.07	9.29	63.16	14.50	41.15
38.	TSS 5	41.67	85.67	1.56	110.53	4.93	4.47	5.20	26.20	62.80	20.87	55.17	56.45	59.51	1.51	66.57	2.87	9.60	73.61	13.21	41.55
39.	TSS 4	39.33	86.67	0.85	95.07	5.67	5.13	6.07	11.93	57.53	22.67	63.43	72.27	63.45	1.50	66.72	3.09	10.03	62.51	15.82	40.97
40.	SI 1502	38.00	85.33	1.36	100.33	5.07	3.67	6.27	28.33	62.87	25.47	69.80	80.17	66.32	1.43	70.81	3.22	9.57	61.51	15.51	41.13
41	SI 1003	38.33	85.33	0.82	97.60	5.40	4.53	4.60	24.40	59.40	20.32	61.77	67.71	63.53	1.23	73.07	3.36	9.91	57.70	17.34	40.90
42.	SI 1248	36.33	83.67	1.91	87.87	4.67	3.87	6.07	27.87	55.13	18.53	68.38	81.32	75.34	1.22	68.84	2.79	6.22	60.54	13.58	41.42
43.	SI 1125	37.33	85.33	1.66	108.40	4.47	2.47	4.93	31.47	66.53	14.80	60.33	66.74	50.60	1.35	66.98	3.05	8.66	64.00	13.43	41.07
	SI 1003 X																				
44.	CO 1	41.33	85.33	1.18	102.93	4.67	5.13	6.93	23.33	52.00	30.07	56.13	65.96	86.69	1.64	71.55	2.89	9.36	68.91	14.36	40.53
45.	TSS 5	40.33	86.33	0.59	92.67	4.20	4.27	5.80	22.73	52.27	20.67	66.19	81.17	57.04	1.46	66.13	3.24	10.74	49.92	21.51	40.32
46.	TSS 4	42.33	85.67	0.77	104.13	5.20	5.53	6.27	28.07	60.53	18.73	67.64	80.23	47.18	1.29	69.57	3.07	10.23	62.80	16.24	41.15
47.	SI 1502	40.33	85.00	1.59	103.20	4.47	4.13	6.60	22.60	47.27	17.20	49.51	58.77	55.69	1.25	80.58	2.91	8.12	64.16	12.73	41.27
48.	SI 1484	40.67	84.33	0.82	97.60	5.20	4.60	4.93	28.07	64.20	28.33	60.98	71.60	71.46	1.45	65.99	3.01	7.92	56.36	14.31	40.12
49.	SI 1248	40.33	84.67	1.10	100.47	5.20	5.53	5.27	25.00	65.20	26.20	63.70	76.67	72.41	1.50	68.56	2.83	8.28	56.74	14.64	41.52
50.	SI 1125	42.33	87.00	0.19	88.87	5.13	5.00	4.93	23.73	73.87	20.53	57.06	70.41	69.21	1.45	65.25	2.99	9.90	74.46	13.23	41.43

S.No	Parent	No.of days to 50 per cent flowering	No.of days to maturity	Leaf area Index	Plant height (cm)	No.of prim-aries	No.of secon-daries	First capsule bearing node	No.of capsules on			No.of capsule bearing nodes to total no. of nodes on			Volume of the capsule (cm^3)	Number of seeds per capsule	1000 -seed weight (g)	Seed yield per plant (g)	Total DMP (g)	Harvest index (per cent)	Oil content (Per cent)
									Main stem	Prima-ries	Secon-daries	main stem (per cent)	Prima-ries (per cent)	Secon-daries (per cent)							
	Si 1248 X																				
51.	CO 1	40.33	86.33	0.71	90.60	5.27	5.20	5.93	26.53	72.27	29.33	63.60	83.37	73.27	1.00	60.97	2.83	10.21	59.85	17.02	41.53
52.	TSS 5	39.33	84.67	1.04	92.80	5.33	4.93	6.13	23.00	57.27	26.13	68.42	68.51	85.99	1.25	67.89	3.19	10.50	72.84	14.51	41.78
53.	TSS 4	42.33	87.33	1.32	92.40	4.60	5.33	6.87	26.40	66.20	23.87	56.24	88.47	64.50	1.28	69.44	3.05	12.73	63.12	20.23	42.10
54.	Si 1502	39.33	85.67	1.04	101.00	4.40	4.07	6.67	24.47	49.27	9.07	54.82	66.84	49.80	1.60	66.56	3.17	11.62	66.25	17.40	39.83
55.	Si 1484	39.00	84.33	1.33	86.27	4.53	4.40	4.80	23.67	71.67	23.47	44.12	88.64	63.64	1.17	58.04	2.59	8.80	54.50	16.31	42.00
56	Si 1003	38.33	88.00	1.57	86.20	4.73	4.73	5.47	22.20	58.13	22.87	56.74	65.01	52.09	1.06	73.40	2.94	8.74	60.82	14.35	41.60
57.	Si 1125	42.67	85.00	1.04	113.13	4.87	4.60	6.13	27.40	58.87	25.67	54.31	62.06	70.67	1.58	69.23	3.01	11.54	66.65	17.45	41.72
	Si 1125 X																				
58.	CO 1	39.67	85.67	1.63	108.87	5.33	4.93	5.80	27.73	62.73	27.20	54.86	63.27	83.84	1.41	66.22	3.14	12.19	81.89	15.13	41.52
59.	TSS 5	40.67	85.00	1.74	104.93	5.27	5.40	6.67	25.73	67.27	25.87	58.96	87.01	52.83	1.25	68.30	2.92	12.66	68.30	18.51	42.18
60.	TSS 4	40.67	85.67	1.80	94.80	5.27	5.60	6.73	24.13	61.87	28.60	56.48	60.58	76.93	1.29	64.47	3.15	15.53	71.82	21.68	42.25
61.	Si 1502	42.33	86.67	0.89	119.91	5.60	5.53	6.53	26.53	75.27	40.33	70.63	82.19	93.89	1.35	63.61	3.00	10.96	64.65	17.31	41.67
62.	Si 1484	40.67	87.33	1.55	114.73	5.13	5.07	6.53	22.07	51.13	20.60	54.47	59.67	69.50	1.56	67.04	3.01	11.56	65.29	18.06	42.53
63.	Si 1003	39.67	84.67	1.70	102.93	4.93	5.07	6.93	24.27	59.27	21.67	58.50	65.23	64.62	1.10	66.35	3.29	10.07	63.11	15.89	41.53
64.	Si 1248	41.33	84.33	0.99	96.53	4.90	5.00	7.30	23.50	69.30	28.30	55.82	78.56	73.58	1.19	65.81	2.94	12.19	54.76	22.19	41.25
Mean of parents		41.29	86.19	1.41	101.58	5.32	4.94	6.25	24.16	59.63	25.01	56.56	70.34	67.37	1.19	67.56	3.15	10.01	69.34	14.36	41.44
Mean of hybrids		40.10	85.68	1.28	102.52	4.85	4.99	6.02	25.88	63.40	25.15	60.44	73.44	70.03	7.34	68.92	3.08	10.81	67.30	16.18	41.34
SEd		3.67	2.60	0.67	12.42	1.00	1.74	1.23	4.33	16.54	10.12	11.87	15.68	20.60	0.31	8.77	0.30	3.40	12.96	4.61	1.30
CD (P=0.05)		7.26	5.15	1.33	-	1.98	3.44	2.43	8.57	32.73	20.03	23.49	31.03	40.77	0.61	17.36	-	6.73	25.65	9.12	2.57

ecorded 90.53 capsules. Parental mean vas 108.79 and four parents viz., TSS 5, TSS 4, Si 1502, and Si 1248 exceeded the parental mean value. Among the hybrids, a maximum value of 144.94 was registered by TSS 4 x Co 1 and a minimum of 82.81 by Si 1248 x Si 1502. Twenty eight hybrids exceeded the mean value of 114.43 for hybrids.

For number of seeds per capsule, range observed was between 60.90 (TSS 4) and 82.85 (Si 1484) among the parents and 58.04 (Si 1248 x Si 1484) to 80.58 (Si 1003 x Si 1502) among the hybrids. 1000-seed weight among parents was minimum (2.88 g) in Si 1248 and maximum (3.43 g) in Si 1125 among the parents and 2.59 g (Si 1248 x Si 1484) and 3.42 g (TSS 4 x TSS 5) among the hybrids.

For seed yield, among the parents, a very wide range of 5.88 g (Si 1003) to 14.97 g (TSS 4) was observed. Among the hybrids it ranged from 7.54 g (Co 1 x TSS 4) to 15.53 g (Si 1125 x TSS 4). Variations for oil content was very less. Minimum values were 40.28 per cent (Si 1484) and 29.60 per cent (Si 1502 x Si 1484) and maximum values were 42.83 per cent (TSS 4) and 42.87 per cent (TSS 4 x TSS 5) among parents and hybrids respectively.

Among the parents TSS 4 x TSS 5 and Co 1 recorded high mean values for seed yield. The first five hybrids that registered high seed yield have TSS 4 as one of the parents in four cases and TSS 5 and Co 1 in two cases each. Besides seed yield, TSS 4 recorded maximum values for eight other characters. TSS 5 and Co 1 registered fairly good values for seven and ten characters respectively.

The genotypes TSS 4, TSS 5 and Co 1 were the best genotypes out of 50 genotypes studied by Reddy (1956) based on mean performance of seed yield and many other characters and it is in agreement to the present study.

Based on the number of times a genotypec is occurring as one of the parents for the hybrids recording high values, the genotypes that were identified as donors for different plant attributes are Si 1502 and Si 1248 for earliness, Co 1, TSS 4 and Si 1125 for leaf area index, TSS 5, Si 1003 and Si 1125 for vegetative vigour, TSS 5, Si 1502, Si 1484 and Si 1003 for first capsule bearing node, TSS 5, TSS 4, Si 1248 and Si 1502 for number of capsules, Co 1, TSS 4, Si 1502 and Si 1484 for percentage of fruiting nodes to total nodes, TSS 5, TSS 4 and Co 1 for seed yield and total dry matter production and TSS 5, TSS 4, Si 1502 and Si 1125 for oil content. These genotypes can be used as parents in the hybridization programme for improving seed yield and other component traits.

REFERENCE

REDDY, O.U.K. 1986. Studies on variability, character association and genetic divergence in **Sesamum indicum** L. M.Sc. (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore. pp. 106.