



HETEROSIS STUDIES IN SESAME (*SESAMUM INDICUM* L.)

Shobha Rani, T¹., Kiran babu , T.,² Madhukar rao, P.³Thippeswamy, S⁴., Kiran Reddy, G.⁵Soujanya, A⁶

¹Scientist (Plant breeding), AICRP on Sesame, ²Scientist (Plant pathology), AICRP on Sesame, ³Scientist (Agronomy), ⁴Scientist (Plant breeding), ⁵Scientist (Soil Science), ⁶Senior Research Fellow, AICRP on Sesame

Regional Agricultural Research Station, Polasa-505 529 Jagtial, Karimnagar dist., Telangana.

Corresponding Author: Email: shobhapjtsau@gmail.com

ABSTRACT: Heterosis breeding is a potential technique to improve yields in sesame. 24 diverse sesame genotypes were used as male parents and highly adoptable three local varieties were used as female parents. 38 hybrids were produced during rabi, 2013 and were evaluated along with parents and three checks during summer, 2014 in Randomized Block Design at Regional Agricultural Research Station, Polasa, Jagtial. The data was recorded for eight biometrical traits viz., days to 50% flowering, days to maturity, plant height, number of primary branches per plant, number of capsules per plant, capsule length and number of seeds per capsule, 1000 seed weight and seed yield per plant. In the present study highly significant differences were recorded among sesame hybrids for all the traits studied. Further, two hybrids Swetha thil x VS 07-023 and Swetha thil x JL SEL 05-3 had recorded highest standard heterosis of 13.40 % and 10.70 % respectively. The same hybrids recorded statistically significant superior seed yield per plant i.e., 28.7 g and 28.0 g respectively. Keeping above points in view, these two crosses are identified as potential experimental hybrids.

Key words: Heterosis, Heterobeltiosis, Standard heterosis, *Sesamum indicum* L., Phenotypic and genotypic coefficients of variation.

INTRODUCTION

Sesame is highly nutritive, having medicinal value with high oil (38-54%) and protein content (18-25%). The present sesame varieties under cultivation have limited yield potential as most of the varieties evolved and released for cultivation are selections from local or closely related populations. In addition they lack resistance to biotic and abiotic stresses during the crop growth period, all these major causes attributed to low productivity potential of cultivars grown in India. Although sesame is largely self-pollinated, high levels of heterosis have been reported for certain hybrid combinations from various countries. Success of hybrids is observed in several crops viz., cotton, maize, sorghum and even in oil seed crops like sunflower and castor. Generally high levels of heterosis will be obtained when the parents of hybrids were from very divergent origins. Heterobeltiosis has been reported by Murthy [1], Brar and Ahuja [2], Murty [3], Mazzani *et al.*, [4], Osman and Yermanos [5], Yermanos [6], Sharma [7], Osman [8], Zhan *et.al.* [9], Reddy and Haripriya [10], Tu [11], and Quijada and Layrisse [12]. Based on the earlier reports of high heterosis in sesame, National crossing programme for development of hybrid sesame was initiated in collaboration with Directorate of Oil seeds Research, Rajendranagar, Hyderabad, during 2013-14 with the objective of development and identification of superior experimental hybrids.

MATERIALS AND METHODS

Twenty four diverse sesame genotypes were used as male parents and crossed to highly adoptable three female parents viz., Rajeshwari, JCS1020 and Swetha thil. Parents were sown during *rabi*, 2013 and crosses were attempted by emasculating female parents (Rajeshwari, JCS1020 and Swetha thil) and pollinating with 24 male parental lines, finally producing a total of 38 experimental hybrids. These 38 experimental hybrids along with 23 parents and three checks were evaluated in Randomized Block Design during *summer*, 2014 at RARS, Polasa, Jagtial. Three genotypes, TKG 22 (national check), Pragathi (zonal check) and Swetha thil (local check) were used as checks in the experiment. Each entry was sown in one row of 2 m length in two replications with a spacing of 30 cm between the rows and 10 cm between the plants.

Twenty plants were maintained for each entry in each replication. Recommended cultural practices were followed uniformly to all the entries. Observations were recorded in ten randomly selected plants in each replication. The data was recorded for eight biometrical traits viz., days to 50% flowering, plant height, number of primary branches per plant, number of capsules per plant, capsule length and number of seeds per capsule, 1000 seed weight (g) and seed yield per plant (g).

Data analysis

Phenotypic and genotypic coefficients of variation were estimated according to the method suggested by Burton and de Vane [13].

Seed yield was recorded in each entry and Heterosis, Heterobeltiosis and Standard heterosis were calculated for seed yield per plant following the method of Singh and Chaudhary [14].

RESULTS AND DISCUSSION

Variance components and Coefficients of variation

Estimates of phenotypic (PCV) and genotypic (GCV) coefficients of variation are given in Table 1. The lowest genotypic coefficient of variation (23.07%) was observed for 1000 seed weight while it was highest (62.63%) for seed yield per plant. Similarly, lowest phenotypic coefficient of variation (29.56%) was observed for 1000 seed weight while it was highest (69.56%) for seed yield per plant.

The GCV values were lower than that of PCV, indicating that the environment had an important role in the expression of these characters. Generally, quantitative characters are highly influenced by environment.

All the eight characters had high genotypic (GCV) and phenotypic (PCV) coefficients of variation. This finding indicates that, selection may be effective based on these characters and their phenotypic expression would be a good indication of genetic potential. There is large scope for selection based on these characters and the diversity in genotypes provides huge potential for future breeding programme. Similar finding was reported by Sumathi and Muralidharan [15] for number of primary branches per plant and seed yield. Arameshwarappa *et al.* [16] reported similar results considering number of capsules per plant, number of primary branches per plant and number of seeds per capsule, where high PCV and GCV values were recorded except for number of capsules/plant that had medium GCV. Solanki and Gupta [17] and Saravanan and Nandarajan [18] recorded the highest coefficient of variation for number of capsules per plant and branches per plant. Furthermore, Vasline *et al.* [19] also reported that high coefficient of variation for number of capsules per plant.

Table 1. Estimates of range, mean, phenotypic and genotypic coefficients of variation of sesame hybrids evaluated during summer, 2014, RARS, Polasa, Jagtial.

Trait	Range	Mean	SE	PCV (%)	GCV (%)
Days to 50 % flowering	39.20 - 62.43	46.66	7.23	54.41	41.18
Plant height (cm)	38.6 - 145.06	68.52	5.57	63.59	48.46
Number of capsules per plant	73.28-162.53	111.21	2.59	62.96	44.14
Capsule length (cm)	2.36 - 3.43	2.86	1.44	42.40	34.29
Number of seeds per capsule	46.56 - 86.73	61.86	2.46	65.74	49.94
Number of branches per plant	2.30 - 6.83	5.6	0.76	51.61	49.01
1000 seed weight (g)	2.61 - 3.19	2.93	0.69	29.56	23.07
Seed yield per plant (g)	16.0 - 28.7	22.80	0.62	69.56	62.63

Heterosis, Heterobeltiosis and Standard Heterosis for Yield and Yield Components

Number of capsules per plant

Heterosis

Thirty three experimental hybrids exhibited positive heterosis for number of capsules per plant, while five experimental hybrids showed negative heterosis over mid parent (Table 2). Two experimental hybrids i.e., *Swetha thil x VS 07-023* (60.44 %) followed by *Rajeshwari x Nesedi selection* (48.44 %) exhibited highest heterosis.

Heterobeltiosis

Twenty-five experimental hybrids exhibited positive heterosis, while eleven experimental hybrids showed negative heterosis over better parent. Experimental hybrids *JCS 1020 x HAVERI* (27.3 %) and *Rajeshwari x JCS 1020* (23.9 %) exhibited highest heterobeltiosis.

Standard Heterosis

Twenty-seven experimental hybrids exhibited positive heterosis, while nine experimental hybrids showed negative heterosis over national check, TKG 22. Similarly, thirty-six crosses exhibited positive heterosis, whereas two crosses showed negative heterosis over zonal check Pragathi. While, sixteen crosses exhibited positive heterosis and twenty-two crosses showed negative heterosis over local check Swetha thil. Two experimental hybrids i.e., *Swetha thil x VS 07-023* and *Swetha thil x JL SEL 05-3* exhibited significantly superior standard heterosis over all the three checks used in the present experiment viz., 33.80 % and 32.90 % over TKG 22, 41.90 % and 41.10 % over Pragathi and 20.30 % and 19.20 % over Swetha-thil.

Table 2: Evaluation of Sesame Hybrids with Number of capsules per plant for Heterosis (MP), Heterobeltiosis (BP) and Standard heterosis (SC) during summer, 2014, RARS, Jagtial.

S.No	Pedigree	Seed yield/plant (g)			Heterosis	Heterobeltiosis	Standard heterosis		
		Hybrid	Parent 1 (F)	Parent 2 (M)			TKG 22 (NC)	Pragathi (ZC)	Swetha (LC)
1	<i>Rajeshwari x JCS 1020</i>	134	102	96	35.35	23.9	26.9	35.8	11.9
2	<i>Rajeshwari x Nanabhanadra</i>	128	102	97	28.64	20.3	23.4	32.8	7.8
3	<i>Rajeshwari x AT 213</i>	129	102	99	28.36	20.9	24.0	33.3	8.5
4	<i>Rajeshwari x LT 8</i>	128	102	93	31.28	20.3	23.4	32.8	7.8
5	<i>Rajeshwari x HAVERI</i>	106	102	97	6.53	3.8	7.5	18.9	-11.3
6	<i>Rajeshwari x CST 2008-2</i>	112	102	94	14.29	8.9	12.5	23.2	-5.4
7	<i>Rajeshwari x JL SEL 05-3</i>	121	102	78	34.44	15.7	19.0	28.9	2.5
8	<i>Rajeshwari x Nes.selection</i>	128	102	70	48.84	20.3	23.4	32.8	7.8
9	<i>Rajeshwari x TKG 87</i>	107	102	80	17.58	4.7	8.4	19.6	-10.3
10	<i>Rajeshwari x Prachi</i>	97	102	74	10.23	-5.2	-1.0	11.3	-21.6
11	<i>Rajeshwari x MT 10-81</i>	128	102	98	28.00	20.3	23.4	32.8	7.8
12	<i>Rajeshwari x DS-30</i>	116	102	94	18.37	12.1	15.5	25.9	-1.7
13	<i>Rajeshwari x YLM-17</i>	93	102	54	19.23	-9.7	-5.4	7.5	-26.9
14	<i>Rajeshwari x TKG-22</i>	102	102	98	2.00	0.0	3.9	15.7	-15.7
15	<i>Rajeshwari x VS 07-023</i>	115	102	74	30.68	11.3	14.8	25.2	-2.6
16	<i>Rajeshwari x JLS 408-2</i>	128	102	70	48.84	20.3	23.4	32.8	7.8
17	<i>Rajeshwari x RT 125</i>	105	102	66	25.00	2.9	6.7	18.1	-12.4
18	<i>Rajeshwari x Nirmala</i>	99	102	84	6.45	-3.0	1.0	13.1	-19.2
19	<i>Rajeshwari x Madhavi</i>	97	102	82	5.43	-5.2	-1.0	11.3	-21.6
20	<i>Rajeshwari x Chandana</i>	98	102	96	-1.01	-4.1	0.0	12.2	-20.4
21	<i>JCS 1020 x NanaBhanadra</i>	123	96	97	27.46	21.1	20.3	30.1	4.1
22	<i>JCS 1020 x AT 213</i>	122	96	99	25.13	18.9	19.7	29.5	3.3
23	<i>JCS 1020 x HAVERI</i>	132	96	88	43.48	27.3	25.8	34.8	10.6
24	<i>JCS 1020 x CST 2008-2</i>	96	96	94	1.05	0.0	-2.1	10.4	-22.9
25	<i>JCS 1020 x JL SEL 05-3</i>	87	96	72	3.57	-10.3	-12.6	1.1	-35.6
26	<i>JCS 1020 x Nes.selection</i>	94	96	68	14.63	-2.1	-4.3	8.5	-25.5
27	<i>JCS 1020 x MT 10-81</i>	102	96	98	5.15	3.9	3.9	15.7	-15.7
28	<i>JCS 1020 x DS-30</i>	106	96	94	11.58	9.4	7.5	18.9	-11.3
29	<i>JCS 1020 x TKG-22</i>	124	96	102	25.25	17.7	21.0	30.6	4.8
30	<i>JCS 1020 x VS 07-023</i>	122	96	80	38.64	21.3	19.7	29.5	3.3
31	<i>JCS 1020 x JLS 408-2</i>	83	96	72	-1.19	-15.7	-18.1	-3.6	-42.2
32	<i>JCS 1020 x DS 10</i>	104	96	62	31.65	7.7	5.8	17.3	-13.5
33	<i>Swetha x LT 8</i>	93	118	96	-13.08	-26.9	-5.4	7.5	-26.9
34	<i>Swetha x JL SEL 05-3</i>	142	118	74	47.92	16.9	31.0	39.4	16.9
35	<i>Swetha x YLM-17</i>	73	118	58	-17.05	-61.6	-34.2	-17.8	-61.6
36	<i>Swetha x VS 07-023</i>	146	118	64	60.44	19.2	32.9	41.1	19.2
37	<i>Swetha x Madhavi</i>	148	118	82	48.00	20.3	33.8	41.9	20.3
38	<i>Swetha x CST 2008-2</i>	98	118	80	-1.01	-20.4	0.0	12.2	-20.4

1000 Seed weight

Heterosis

Thirty two experimental hybrids exhibited positive heterosis for 1000 seed weight per plant, while five experimental hybrids showed negative heterosis over mid parent (Table 3). Two experimental hybrids i.e., *JCS 1020 x MT 10-81* (3.6 %) followed by *Rajeshwari x YLM-17* (3.5 %) exhibited highest heterosis.

Heterobeltiosis

Twenty-five experimental hybrids exhibited positive heterosis, while nine experimental hybrids showed negative heterosis over better parent. Experimental hybrids *JCS 1020 x CST 2008-2* (2.3 %) and *JCS 1020 x MT 10-81* (2.0 %) exhibited highest heterobeltiosis.

Standard Heterosis

Thirty-three experimental hybrids exhibited positive heterosis, while five experimental hybrids showed negative heterosis over national check, TKG 22. Whereas all the thirty eight crosses exhibited positive heterosis over zonal check Pragathi. While, nineteen crosses exhibited positive heterosis and sixteen crosses showed negative heterosis over local check Swetha thil. Two experimental hybrids i.e., *Swetha thil x VS 07-023* and *Swetha thil x JL SEL 05-3* exhibited significantly superior standard heterosis over all the three checks used in the present experiment viz., 33.80 % and 32.90 % over TKG 22, 41.90 % and 41.10 % over Pragathi and 20.30 % and 19.20 % over Swetha-thil.

Table 3: Evaluation of Sesame Hybrids with 1000 seed weight for Heterosis (MP), Heterobeltiosis (BP) and Standard heterosis (SC) during summer, 2014, RARS, Jagtial.

S.No	Pedigree	Seed yield/plant (g)			Heterosis	Heterobeltiosis	Standard heterosis		
		Hybrid	Parent 1 (F)	Parent 2 (M)			TKG 22 (NC)	Pragathi (ZC)	Swetha (LC)
1	<i>Rajeshwari x JCS 1020</i>	3.03	3.01	2.96	1.5	0.7	2.3	4.9	0.3
2	<i>Rajeshwari x Nanabhanadra</i>	3.01	3.01	2.84	3.0	0.1	1.7	4.4	-0.3
3	<i>Rajeshwari x AT 213</i>	3.03	3.01	2.93	2.0	0.7	2.3	4.9	0.3
4	<i>Rajeshwari x LT 8</i>	3.03	3.01	2.95	1.7	0.7	2.3	4.9	0.3
5	<i>Rajeshwari x HAVERI</i>	3.01	3.01	2.91	1.7	0.0	1.6	4.3	-0.3
6	<i>Rajeshwari x CST 2008-2</i>	2.98	3.01	2.93	0.5	-0.9	0.8	3.5	-1.2
7	<i>Rajeshwari x JL SEL 05-3</i>	3.03	3.01	2.97	1.3	0.6	2.2	4.9	0.2
8	<i>Rajeshwari x Nes.selection</i>	2.93	3.01	2.91	-0.9	-2.6	-0.9	1.8	-2.9
9	<i>Rajeshwari x TKG 87</i>	3.03	3.01	2.91	2.3	0.6	2.3	4.9	0.3
10	<i>Rajeshwari x Prachi</i>	3.04	3.01	2.96	1.9	1.0	2.7	5.3	0.7
11	<i>Rajeshwari x MT 10-81</i>	3.03	3.01	2.89	2.8	0.8	2.4	5.0	0.4
12	<i>Rajeshwari x DS-30</i>	3.03	3.01	2.93	2.1	0.7	2.4	5.0	0.4
13	<i>Rajeshwari x YLM-17</i>	3.06	3.01	2.91	3.5	1.7	3.4	6.0	1.4
14	<i>Rajeshwari x TKG-22</i>	3.03	3.01	2.98	1.1	0.6	2.3	4.9	0.3
15	<i>Rajeshwari x VS 07-023</i>	3.05	3.01	2.91	3.1	1.3	3.0	5.6	1.0
16	<i>Rajeshwari x JLS 408-2</i>	2.90	3.01	2.90	-2.0	-4.0	-2.2	0.5	-4.3
17	<i>Rajeshwari x RT 125</i>	3.02	3.01	2.91	1.9	0.2	1.8	4.5	-0.2
18	<i>Rajeshwari x Nirmala</i>	3.04	3.01	2.93	2.4	1.0	2.7	5.3	0.7
19	<i>Rajeshwari x Madhavi</i>	3.03	3.01	2.91	2.5	0.8	2.4	5.1	0.4
20	<i>Rajeshwari x Chandana</i>	3.01	3.01	2.89	2.0	0.0	1.7	4.3	-0.3
21	<i>JCS 1020 x NanaBhanadra</i>	2.91	2.98	2.84	0.1	-2.3	-1.6	1.2	-3.6
22	<i>JCS 1020 x AT 213</i>	3.03	2.98	2.93	2.5	1.6	2.3	4.9	0.3
23	<i>JCS 1020 x HAVERI</i>	2.90	2.98	2.91	-1.6	-2.8	-2.1	0.6	-4.2
24	<i>JCS 1020 x CST 2008-2</i>	3.05	2.98	2.93	3.3	2.3	3.0	5.6	1.0
25	<i>JCS 1020 x JL SEL 05-3</i>	2.97	2.98	2.97	0.0	-0.2	0.5	3.2	-1.5
26	<i>JCS 1020 x Nes.selection</i>	3.00	2.98	2.91	1.8	0.6	1.3	4.0	-0.7
27	<i>JCS 1020 x MT 10-81</i>	3.04	2.98	2.89	3.6	2.0	2.7	5.3	0.7
28	<i>JCS 1020 x DS-30</i>	3.02	2.98	2.93	2.2	1.3	2.0	4.6	0.0
29	<i>JCS 1020 x TKG-22</i>	3.04	2.98	2.96	2.2	1.8	2.5	5.1	0.5
30	<i>JCS 1020 x VS 07-023</i>	2.99	2.98	2.91	1.4	0.2	0.9	3.6	-1.1
31	<i>JCS 1020 x JLS 408-2</i>	3.01	2.98	2.90	2.3	0.9	1.6	4.3	-0.4
32	<i>JCS 1020 x DS 10</i>	3.03	2.98	2.99	1.4	1.3	2.2	4.9	0.3
33	<i>Swetha x LT 8</i>	3.02	3.02	2.89	2.2	0.0	2.0	4.6	0.0
34	<i>Swetha x JL SEL 05-3</i>	2.99	3.02	2.97	-0.1	-0.9	1.1	3.7	-0.9
35	<i>Swetha x YLM-17</i>	3.02	3.02	2.91	1.9	0.0	2.0	4.7	0.0
36	<i>Swetha x VS 07-023</i>	2.99	3.02	2.91	0.7	-1.1	0.9	3.5	-1.1
37	<i>Swetha x Madhavi</i>	2.91	3.02	2.91	-2.0	-4.0	-1.9	0.9	-4.0
38	<i>Swetha x CST 2008-2</i>	3.03	3.02	2.93	1.9	0.4	2.4	5.0	0.4

Seed yield per Plant**Heterosis**

For seed yield per plant (Table 4), thirty experimental hybrids exhibited positive heterosis, while eight experimental hybrids showed negative heterosis over mid parent. Two experimental hybrids i.e., *JCS 1020 x AT 213* (52%) followed by *Swetha thil x US 07-023* (39%) exhibited highest heterosis.

Heterobeltiosis

Twenty-one experimental hybrids exhibited positive heterosis, while seventeen experimental hybrids showed negative heterosis over better parent. Experimental hybrids *JCS 1020 x AT 213* (46.2%) and *JCS 1020 x TKG-22* (27.6%) exhibited highest heterobeltiosis.

Table 4: Evaluation of Sesame Hybrids with seed yield per plant (g) for Heterosis (MP), Heterobeltiosis (BP) and Standard heterosis (SC) during summer, 2014, RARS, Jagtial.

S.No	Pedigree	Seed yield/plant (g)			Heterosis	Heterobeltiosis	Standard heterosis		
		Hybrid	Parent 1 (F)	Parent 2 (M)			TKG 22 (NC)	Pragathi (ZC)	Swetha (LC)
1	<i>Rajeshwari x JCS 1020</i>	27.6	23.2	19.6	29.0	19.0	27.78	51.65	9.10
2	<i>RajeshwarixNanabhanadra</i>	25.5	23.2	20.5	16.7	9.9	18.06	40.11	0.80
3	<i>Rajeshwari x AT 213</i>	27.2	23.2	21.2	22.5	17.2	25.93	49.45	7.50
4	<i>Rajeshwari x LT 8</i>	26.5	23.2	18	28.6	14.2	22.69	45.60	4.70
5	<i>Rajeshwari x HAVERI</i>	22.0	23.2	17.5	8.1	-5.2	1.85	20.88	-13.00
6	<i>Rajeshwari x CST 2008-2</i>	22.0	23.2	18.5	5.5	-5.2	1.85	20.88	-13.00
7	<i>Rajeshwari x JL SEL 05-3</i>	25.5	23.2	16	30.1	9.9	18.06	40.11	0.80
8	<i>Rajeshwari x Nes.selection</i>	24.5	23.2	14	31.7	5.6	13.43	34.62	-3.20
9	<i>Rajeshwari x TKG 87</i>	21.5	23.2	16.5	8.3	-7.3	-0.46	18.13	-15.00
10	<i>Rajeshwari x Prachi</i>	20.0	23.2	16	2.0	-13.8	-7.41	9.89	-20.90
11	<i>Rajeshwari x MT 10-81</i>	27.0	23.2	20	34.3	25.0	25.00	48.35	6.70
12	<i>Rajeshwari x DS-30</i>	24.5	23.2	18	18.9	5.6	13.43	34.62	-3.20
13	<i>Rajeshwari x YLM-17</i>	19.0	23.2	12	8.0	-18.1	-12.04	4.40	-24.90
14	<i>Rajeshwari x TKG-22</i>	21.0	23.2	21.6	1.9	-9.5	-2.78	15.38	-17.00
15	<i>Rajeshwari x VS 07-023</i>	24.5	23.2	16	25.0	5.6	13.43	34.62	-3.20
16	<i>Rajeshwari x JLS 408-2</i>	24.0	23.2	15	25.7	3.4	11.11	31.87	-5.10
17	<i>Rajeshwari x RT 125</i>	22.0	23.2	14	18.3	-5.2	1.85	20.88	-13.00
18	<i>Rajeshwari x Nirmala</i>	21.0	23.2	16.5	5.8	-9.5	-2.78	15.38	-17.00
19	<i>Rajeshwari x Madhavi</i>	20.5	23.2	16.5	3.3	-11.6	-5.09	12.64	-19.00
20	<i>Rajeshwari x Chandana</i>	20.4	23.2	19.6	-4.7	-12.1	-5.56	12.09	-19.40
21	<i>JCS 1020xNanaBhanadra</i>	23.3	19.6	20.5	16.2	13.7	7.87	28.02	-7.90
22	<i>JCS 1020 x AT 213</i>	26.0	19.6	21.2	52.0	46.2	20.37	42.86	2.80
23	<i>JCS 1020 x HAVERI</i>	24.8	19.6	17.5	33.7	26.5	14.81	36.26	-2.00
24	<i>JCS 1020 x CST 2008-2</i>	19.5	19.6	18.5	2.4	-0.5	-9.72	7.14	-22.90
25	<i>JCS 1020 x JL SEL 05-3</i>	17.0	19.6	16	-4.5	-13.3	-21.30	-6.59	-32.80
26	<i>JCS 1020 x Nes.selection</i>	18.6	19.6	14	10.7	-5.1	-13.89	2.20	-26.50
27	<i>JCS 1020 x MT 10-81</i>	21.3	19.6	20	7.6	6.5	-1.39	17.03	-15.80
28	<i>JCS 1020 x DS-30</i>	23.0	19.6	18	22.3	17.3	6.48	26.37	-9.10
29	<i>JCS 1020 x TKG-22</i>	25.0	19.6	21.6	33.0	27.6	15.74	37.36	-1.20
30	<i>JCS 1020 x VS 07-023</i>	24.0	19.6	16	34.8	22.4	11.11	31.87	-5.10
31	<i>JCS 1020 x JLS 408-2</i>	16.5	19.6	15	-4.6	-15.8	-23.61	-9.34	-34.80
32	<i>JCS 1020 x DS 10</i>	21.3	19.6	13.5	28.7	8.7	-1.39	17.03	-15.80
33	<i>Swetha x LT 8</i>	18.6	25.3	18	-14.1	-26.5	-13.89	2.20	-26.50
34	<i>Swetha x JL SEL 05-3</i>	28.0	25.3	16	35.6	10.7	29.63	53.85	10.70
35	<i>Swetha x YLM-17</i>	16.0	25.3	12	-14.2	-36.8	-25.93	-12.09	-36.80
36	<i>Swetha x VS 07-023</i>	28.7	25.3	16	39.0	13.4	32.87	57.69	13.40
37	<i>Swetha x Madhavi</i>	27.9	25.3	16.5	38.3	14.2	29.17	53.30	10.30
38	<i>Swetha x CST 2008-2</i>	21.0	25.3	18.5	-4.1	-17.0	-2.78	15.38	-17.00

Standard Heterosis

Twenty-two experimental hybrids exhibited positive heterosis, while sixteen experimental hybrids showed negative heterosis over national check, TKG 22. Similarly, thirty-five crosses exhibited positive heterosis, whereas three crosses showed negative heterosis over zonal check Pragathi. While, ten crosses exhibited positive heterosis and twenty-eight crosses showed negative heterosis over local check Swetha. Two experimental hybrids i.e., *Swetha thil x VS 07-023* and *Swetha thil x VS 07-023* exhibited significantly superior standard heterosis over all the three checks used in the present experiment viz., 32.87 % and 29.63 % over TKG 22, 57.69 % and 53.85 % over Pragathi and 13.40 % and 10.70 % over Swetha-thil. Hence, these two experimental hybrids are very potential and can be recommended for further evaluation in station trial and All India coordinated trials and for further release.

Further, another eight hybrids *Swetha thil x Madhavi* (10.30 %), *Rajeswari x JCS 1020* (9.10 %), *Rajeswari x AT 213* (7.50 %), *Rajeswari x MT 10-81* (6.70 %), *Rajeswari x LT 8* (4.70 %), *JCS 1020 x AT 213* (2.80 %), *Rajeswari x Nanabhanadra* (0.80 % g) and *Rajeswari x JL SEL 05-3* (0.80 %) recorded positive heterosis over standard local check, Swetha. These offer scope for further recombination breeding. These results are in agreement with the findings of Sankar and Kumar (2001), Kumar et al. (2003) were reported positive heterosis for seed yield in sesame.

In conclusion two experimental hybrids *Swetha thil x VS 07-023* and *Swetha thil x JL SEL 05-3* are very promising and can be considered as elite crosses. Keeping evaluation in All India basis and few more potential crosses can be utilized for further recombination breeding to develop potential pureline.

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