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HETEROSIS STUDIES FOR GROWTH, FLOWER AND YIELD CHARACTERS IN SPONGE GOURD (*LUFFA CYLINDRICA* L.)

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ABSTRACT

Sponge gourd (*Luffa cylindrica* L.) also known as Luffa or Gilki, is an easily cultivated plant belongs to the family Cucurbitaceae. *Luffa* is originated in subtropical Asian region particularly India. Despite the crop potential, economic and its medicinal use the present study was undertaken using nine lines and three testers to develop 27 F1 hybrids in L × T (Line × Tester) pattern. Evaluation of hybrids along with their parents revealed that the cross combinations SG-4× Hospet Local, SG-6 × Hospet Local and SG-1 × Hospet Local showed highest negative heterosis for almost the flowering characters such as Node at which first male flower appears, node at which first female flower appers, days to first male flowering, days to first female flowering, days first harvest and 50 % flowering and positive heterosis was observed for characters such as vine length, leaf area, leaf area index, number of branches, per cent fruit set, fruit length, fruit diameter, number of fruits per vine, average fruit, fruit yield per vine, fruit yield per plot and fruit yield per hectare which were supercilious for earliness, yield parameters. Based on its yield potential and favoured earliness characteristics, the SG-4 × Hospet Local hybrid was chosen as the best hybrid out of 27 cross combinations, with a yield of 18.93 t/ ha with 26.66 per cent of standard heterosis. Hence the best hybrids are recommended for commercial exploitation of heterosis.
***Keywords*:** Luffa, hybrids, per se performance, Heterosis, Best parent heterosis, Standard heterosis.

Introduction

Sponge gourd (*Luffa cylindrica* L.) is a tropical member of cucurbitaceous family and *Luffa* genus. *Luffa* is originated in subtropical Asian region particularly India (Kalloo, 1993). It is an annual vine with tendrils and large, cylindrical fruits that are edible when young. It is commonly called as sponge gourd, loofah, vegetable sponge and dish cloth, having diploid chromosome number 2n = 2x = 26. It is known by wide vernacular names like, ghiatori, and ghiraula in different parts of India. It is used as a vegetable either prepared like squash or eaten raw like cucumber. The fruit contains white inner flesh which is fibrous and have flavour similar to bitter melon. Sponge gourd is regarded as an important medicinal plant that needs to be conserved as it is used in the traditional Chinese medicine as an anthelmintic, stomachic and antipyretic phytomedicinal drug. Fresh juice of the leaf is used for healing wounds. Additionally, the luffin, a ribosome-inactivating protein isolated from Luffa seeds is effective against growth of parasites, protozoa, insects, fungi and HIV. In the present study was conducted on Heterosis which refers to the superiority of F_1 hybrid in one or more characters over its parents and it was coined by Shull in 1914. It can be better parent heterosis, heterobeltiosis and economic heterosis. Since, yield is a complex and polygenically inherited trait, knowledge of gene action or pattern of inheritance of different quantitative traits including yield will be helpful to formulate the suitable breeding method to be applied for achieving the improvement of the crop. Out of this, F_1 hybrid breeding is prominent

and used in the improvement of vegetable crops, especially in out breeding species. For this, selection of suitable genotype is the foremost criterion. Hence, a speedy crop improvement can be brought about by assembling the genetical variability, locating the best combiners and exploiting heterosis.

Material and Methods

The present experiment was conducted at Kittur Rani Channamma College of Horticulture, Arabhavi, Belagavi district, Karnataka. The genotypes used in the present study comprised of nine lines namely SG-4, SG-3, SG-6, KRCCH, SG-5, KRCCH-5, SG-2, KRCCH-3 and SG-1 three testers namely Hospet Local, Dharwad Local and Mangundi Local which are of broad genetic base and all these genotypes were collected from various parts of Karnataka and New Delhi which were choosen based on their per se performance for yield attributes. These genotypes were crossed in line × tester pattern to obtain 27 hybrids and the obtained F1's was grown in randomized block design with two replications along with two commercial checks (Pusa Sneha- Pusa chikini). During experimentation all the necessary cultural practices were followed and plant protection measures were taken. The data on various earliness, flowering, yield and quality parameters were recorded from five randomly selected plants. The mean data was subjected to analysis in INDOSTAT 2.0 software to obtain heterosis percentage for various parameters. The heterosis was estimated from mean values, and its significance was tested using t-test.

Results and Discussion

Positive or negative heterosis refers to the F1 hybrids superiority or inferiority to their parents, respectively. Growth and yield factors can be manifested via positive heterosis. The earliest parameters are shown by the negative heterosis. Among the parents, the maximum and minimum values for the trait vine length were observed in 3.70 (SG-3) to 4.38 m (SG-3) among lines, 4.10 (Mangundi Local) to 5.42 m (Hospet Local) among testers and 3.79 (SG-6 × Hospet Local) to 6.75 m (SG-4 × Hospet Local) among crosses The cross between SG-5 × Hospet Local showed the highest levels of heterosis over the better parent (24.90%), the cross KRCCH-5× Hospet Local showed highest levels of heterosis over best parent (20.26%) the cross SG-3× Dharwad Local showed highest level of heterosis over commercial check1 (18.06%). None of the crosses showed positive heterosis over commercial check 2. Out of 27 crosses, five crosses over the better parent, six crosses over best parent, two crosses over commercial check1 showed positive significant heterosis which were found to be similar with the results [Hedau and sirohi (2004a)]. Heterosis over better parent and the commercial check was also reported by several workers on bottle gourd for vine length [Dubey and Maurya (2006), Sharma *et al.* (2012), Yadav and Kumar (2012) and Ghuge *et al.* (2016)]. Varied heterosis for growth parameters is attributed to the use of different genetic stock and different commercial checks in different studies.

Among the parents, the highest and the lowest number of number of branches ranging from 4.30 (SG-1) to 5.30 (SG-3) among lines and from 4.40 (Mangundi Local) to 6.40 (Hospet Local) among testers and 3.30 (SG-3× Dharwad Local) to 8.00 (SG-4 × Hospet Local) among crosses The cross (SG-4 × Hospet Local) showed highest positive heterosis over better parent (24.00 %), the cross SG-6 × Mangundi Local exhibited maximum significant positive heterosis over best parent (33.33%), commercial check1 (36.59%) and the cross SG-3 × Dharwad Local showed maximum significant heterosis over commercial check 2 (47.58%). 10 crosses over better parent, 16 crosses over best parent, 17 crosses over commercial check 1 and two crosses over commercial check 2 out of 27 crosses indicated positive significant heterosis which were found to be similar with the results [Hedau and sirohi (2004a)]. Heterosis over better parent and the commercial check was also reported by several workers on bottle gourd for vine length [Dubey and Maurya (2006), sharma *et al.* (2019), Yadav and Kumar (2012) and Ghuge *et al.* (2016)]. Different responses for number of branches per plant may be caused by the genotype vigour, genetic makeup and intrinsic traits.

The mean of leaf area ranged from 73.60 (KRCCH-3) to 107.00 cm (SG-2) leaf area among lines and from 97.80 (Mangundi Local) to 122.40 (Hospet Local) among testers and 85.70 (SG-4× Mangundi Local) to 136.00 (SG-4 × Hospet Local) among crosses The cross (SG-4 × Dharwad Local) showed highest positive significant heterosis over better parent (20.88%), the cross SG-4 × Hospet Local exhibited maximum significant positive heterosis over best parent (28.27%), SG-2 × Mangundi Local showed highest positive and significant heterosis over commercial check 1 (21.02 %) and none of the crosses showed positive heterosis over commercial check 2. 17 crosses over better parent, 18 crosses over best parent, nine crosses over commercial check 1 and none of the crosses over commercial check 2 out of 27 crosses indicated positive significant heterosis.

Leaf area index varied significantly among the genotypes, among lines it varied from 2.20 (KRCCH)

to 4.20 (SG-4) among tester from 3.50 (Mangundi Local) to 5.00 (Hospet Local) and among crosses 2.80 (KRCCH-3× Mangundi Local) to 7.20 (SG-4 × Hospet Local) among crosses The cross (SG-4 × Hospet Local) showed highest positive heterosis over better parent (42.00%), the cross (SG-4 × Hospet Local) exhibited maximum significant positive heterosis over best parent (54.80%), KRCCH × Mangundi Local) showed significant positive heterosis over commercial check 1. Out of 27 crosses 17 crosses over better parent, 19 crosses over best parent, 15 crosses over commercial check 1 and none of the crosses among commercial check 2 out of 27 crosses indicated positive significant heterosis

Vegetable crops should take the earliness feature into account in order to maximise their potential economic yield. When determining earliness, characteristics like the days to first flowering and days to the first fruit harvest are highly helpful. Negative heterosis is preferred for these traits.

For node at which the first male flower appears it varied from 4.20 (SG-3) to 6.70 (SG-4) among lines, 4.60 (Mangundi Local) to 6.30 (Hospet Local) among testers and 3.40 (KRCCH-5× Hospet Local) to 5.20 (KRCCH-3× Mangundi Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in desirable directions. The maximum and significant negative heterosis (-47.76%) over better parent, best parent (-33.96%) and commercial check 2 (-16.67) was observed in the cross SG-4 × Hospet Local, Pusa Sneha commercial check 1 (-44.44 %). Among 27 crosses, 20 crosses over better parent, 19 crosses over best parent, 24 crosses over commercial check1 and six crosses over commercial check 2 exhibited significant heterosis in the desirable direction (negative) which were found to be similar with the results by Janasandekar (1982), Shaha and Kale (2003), Hedau and Sirohi (2004a), Sonawane (2007), Verma *et al.,* (2010) in ridge gourd and Abusaleha and Dutta (1995), Islam *et al.,* (2012) in sponge gourd.

Days to first male flowering ranged from 34.30 (SG-4) to 47.70 days (KRCCH-3) among lines, 42.00 (Dharwad Local) to 51.40 (Mangundi Local) among testers and 24.50 (KRCCH-5× Hospet Local) and (SG-5 × Hospet Local) to 48.10 days (KRCCH-3× Mangundi Local) among crosses. The cross KRCCH-3× Dharwad Local showed significant negative heterosis over better parent (-47.80%), over best parent (-47.80%). The crosses SG-5× Hospet Local and KRCCH-5 × Hospet Local exhibited negative significant heterosis over commercial check 1 (-19.14%) and over commercial check 2 (-28.57%). Out of 27 crosses, 25 crosses over better parent, 25 crosses over best parent, five crosses over commercial check 1 and 15 crosses over commercial check 2 exhibited significant heterosis in the desirable direction (negative) which were found to be similar with the results by Jansandekar (1982), Shaha and Kale (2003), Hedau and Sirohi (2004a), Sonawane (2007), Verma *et al.,* (2010) in ridge gourd and Abusaleha and Dutta (1995), Islam *et al.* (2012) in sponge gourd.

It varied from 12.40 (SG-3) to 16.30 (SG-4) among lines, 12.00 (Dharwad Local) to 14.60 (Mangundi Local) among testers and 9.10 (SG-6 × Hospet Local) to 14.70 (SG-3× Mangundi Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in desirable directions. The maximum and significant negative heterosis (-42.94%) over better parent was observed in the cross SG-4 × Dharwad Local. The cross SG-4 × Hospet Local exhibited significant negative heterosis over best parent (-39.33%), commercial check 1 (-39.74 %) and commercial check 2 (-24.17 %). Out of 27 crosses, 13 crosses over better parent, 24 crosses over best parent, 24 crosses over commercial check 1 and seven crosses over commercial check 2 exhibited significant heterosis in the desirable direction (negative) which were found to be similar with the results by Bairagi *et al.* (2005), Kumar *et al.* (2010), Singh *et al.* (2010) and Singh *et al.* (2015).

Days to first female flowering ranged from 45.10 (SG-4) to 48.90 days (SG-1) among lines, 45.10 (Hospet Local) to 56.00 days (Mangundi Local) among testers and 33.90 (SG-4× Hospet Local) to 50.00 days (KRCCH × Mangundi Local) among crosses. The cross SG-4× Hospet Local showed negative and significant heterosis over better parent (-29.81%), over best parent (-12.18%), over commercial check 1 (-11.95) and over commercial check 2 (-24.83). Out of 27 crosses, 26 crosses over better parent, four crosses over best parent, two over commercial check 1 and 17 crosses over commercial check 2 exhibited significant heterosis in the desirable direction (negative) which were found to be similar with the results by Bairagi *et al.* (2005), Kumar *et al.* (2010), Singh *et al.* (2010) and Singh *et al.* (2015).

The mean of days to first harvest ranged from 48.30 (SG-5) to 54.70 days (SG-1) among lines, 54.00 (Hospet Local) to 62.70 days (Mangundi Local) among testers and 45.10 (SG-6 × Hospet Local) to 55.50 days (SG-6 × Mangundi Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in both the directions. The maximum and significant negative

heterosis (-20.73 %) over better parent was observed in the cross SG-3× Mangundi Local. The cross SG-6 × Hospet Local exhibited significant negative heterosis over best parent (-20.76%). None of the crosses showed negative heterosis over commercial check 1 and commercial check 2. Out of 27 crosses, 24 crosses over better parent, 19 crosses over best parent, none of the crosses exhibited significant heterosis in the desirable direction for commercial check 1 and commercial check 2 (negative) which were found to be similar with the results by Dey *et al.* (2007).

The mean of days to last harvest ranged from 83.10 (SG-2) to 89.40 days (SG-5) among lines, 86.30 (Dharwad Local) to 91.70 (Mangundi Local) among testers and 79.60 (SG-4× Hospet Local) to 91.40 days (KRCCH-5× Mangundi Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in desirable directions. The cross KRCCH-5× Mangundi Local exhibited positive significant heterosis over best parent (4.43%), commercial check 1 (13.54%), commercial check 2 (9.99%). None of the commercial check showed negative heterosis. Out of 27 crosses, three crosses over best parent, 18 crosses over commercial check 1 and commercial check 2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Naliyadhara *et al.* (2007).

It ranged from 13.50 (SG-4) to 16.10 (SG-2) among lines, 18.10 (Mangundi Local) to 20.50 (Hospet Local) among testers and 15.10 (SG-1 × Mangundi Local) to 23.20 (SG-1 × Hospet Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in desirable directions. The maximum and significant positive heterosis (24.04%) over better parent was observed in the cross KRCCH-3 × Dharwad Local. The cross SG-1× Hospet Local exhibited positive significant heterosis over best parent (13.17 %), the cross KRCCH-3 × Hospet Local showed desirable positive heterosis over commercial check 1 (77.34 %) and commercial check 2 (64.49 %). Out of 27 crosses, 19 crosses over better parent, 17 crosses over best parent, 24 crosses over commercial check 1 and 20 crosses over commercial check 2 exhibited significant heterosis which were found to be similar with the results by Danareddy (2013) and Narasannavar *et al.* (2014).

Significant differences were observed among the genotypes for days to 50 per cent flowering. It varied from 49.20 (KRCCH-5) to 53.00 days (SG-4) among lines, 49.80 (Hospet Local) to 55.00 days (Mangundi Local) among testers and 45.10 (SG-6× Hospet Local) to 53.70 days (SG-3× Mangundi Local) among crosses. The cross SG-6× Hospet Local showed the highest and most significant negative heterosis over the better parent (-16.64 %) and SG-5 × Hospet Local cross showed the highest and most significant negative heterosis over best parent (-11.13 %) and the cross SG-6× Hospet Local showed negative heterosis over commercial check 1) (-13.60 %), commercial check 2 (-17.97). Out of 27 crosses, 16 crosses over better parent, 11 crosses over best parent, 15 over commercial check 1 and 14 crosses over commercial check 2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Singh *et al.* (2020) in bitter gourd.

It ranged from 54.70 (SG-3) to 63.00 (%) (SG-4) among lines, 55.80 (Mangundi Local) to 62.90 (%) (Dharwad Local) among testers for per cent fruit set and 63.80 (%) (KRCCH × Mangundi Local) to 74.60 (%) (SG-6 × Dharwad Local) among crosses. The maximum and significant positive heterosis (20.26%) over better parent was observed in the cross KRCCH-5 × Hospet Local. The cross SG-6 × Dharwad Local exhibited significant positive heterosis over best parent (25.17%), commercial check 1 (25.38%) and commercial check 2 (15.21%). Out of 27 crosses, 22 crosses over better parent, 18 crosses over best parent, 18 crosses over commercial check 1 and 2 crosses over commercial check 2 exhibited significant heterosis which were found to be similar with the results by Venugopala *et al.,* (2019) in sponge gourd.

Fruit length mean ranged from 19.30 (KRCCH) to 21.60 cm (SG-3) among lines, 19.30 (Mangundi Local) to 21.80 cm (Hopest Local) among the testers and 18.50 (SG-6 × Dharwad Local) and (KRCCH × Dharwad Local) to 23.60 cm (SG-4 × Hospet Local). The maximum and significant positive heterosis (9.36%) over better parent was observed in the cross KRCCH × Dharwad Local. The cross SG-4 × Hospet Local exhibited significant positive heterosis over best parent (13.34%). The crosses KRCCH-5 × Hospet, SG-1 × Hospet Local showed positive heteosis over commercial check 1(34.78%), the cross KRCCH × Dhrawad Local showed positive heterosis over commercial check 2(6.73%). Out of 27 crosses, 14 crosses over better parent, 17 crosses over best parent, 27 crosses over commercial check 1 and seven crosses over commercial check 2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Ranpise *et al.* (1992), (Yadav *et al.* 2008) and Naik *et al.* (2020).

Fruit diameter mean ranged from 3.40 (SG-2) to 4.00 cm (SG-4), (KRCCH) among lines, 3.70 (Mangundi Local) to 5.60 cm (Hospet Local) among testers and 3.20 (SG-1× Dharwad Local) to 6.40 cm

(SG-4 × Hospet Local) among crosses. The maximum and significant positive heterosis over better parent (28.89%) was observed in the cross SG-4 × Dharwad Local. The cross SG-4 × Hospet Local exhibited significant positive heterosis over best parent (38.80%), commercial check 1 (53.85 %) and none of the crosses showed positive heterosis over commercial check 2. Out of 27 crosses, 11 crosses over better parent, 17 crosses over best parent, 27 over commercial check 1 and none of the crosses over commercial check 2 exhibited significant heterosis which were found to be similar with the results by Naik *et al.* (2020), Ranpise *et al.* (1992) and (Yadav *et al.* 2008).

Average fruit weight ranged from 114.10 (SG-1) to 133.00g (SG-6) among lines, 118.20 (Mangundi Local) to 131.20g (Hospet Local) among testers and 110.60 g (SG-4× Mangundi Local) to 146.00 (SG-4 × Hospet Local) among crosses. The cross SG-4 × Hospet Local showed positive heterosis over better parent (11.28%), over best parent (9.77), over commercial check 1 (25.75) and over commercial check 2 (25.75). Out of 27 crosses, six crosses over better parent, four crosses over best parent, 18 over commercial check 1 and 18 crosses over commercial check 2 exhibited significant heterosis which were found to be similar with the results by Ranpise *et al.* (1992).

Number of fruits per vine ranged from 9.20 (SG-1) to 12.00 (SG-3) for lines, 9.40 (Mangundi Local) to 12.30 (Hospet Local) for testers and 9.70 (KRCCH-3× Mangundi Local) to 14.00 (SG-4 × Hospet Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in both the directions. The cross SG-4 × Hospet Local showed positive heterosis was observed over better parent (13.82%), over best parent (13.82%), over commercial check 1 (57.30%) and over commercial check 2 (66.67%). Out of 27 crosses, 16 crosses over better parent, 11 crosses over best parent, 21 crosses over commercial check 1 and 25 crosses over commercial check 2 exhibited significant heterosis which were found to be similar with the results by Laxuman *et al.* (2012).

Fruit yield per vine ranged from 1.05 (SG-1) to 1.58 kg (SG-6) for lines, 1.11 (Mangundi Local) to 1.61 kg (Hospet Local) for testers and 1.09 (KRCCH-3× Mangundi Local) to 2.04 (SG-4 × Hospet Local) among crosses. The magnitude of heterosis over better parent, best parent and commercial checks was significant in both the directions. The cross SG-4 × Hospet Local exhibited positive heterosis over better parent (26.32%), over best parent (26.32%), over commercial check 1 (97.10%) and over commercial check 2 (108.16%). Out of 27 crosses, 18 crosses over better parent, 22 crosses over best parent, 18 over commercial check 1 and 22 crosses over commercial check 2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Mohan, 2005.

Fruit yield per plot varied in genotypes and ranged from 9.45 (SG-1) to 14.26 kg (SG-3) among lines, 10.00 (Mangundi Local) to 14.52 kg (Hospet Local) among testers and 9.78 (KRCCH-3× Mangundi Local) to 18.40 kg (SG-4 × Hospet Local) among crosses. The cross SG-4 × Hospet Local showed positive heterosis over better parent (26.66%), over best parent (26.68%), over commercial check 1 (97.85%) and over commercial check 2 (108.85%). Out of 27 crosses, 17 crosses over better parent, 19 crosses over best parent, 18 over commercial Pusa Sneha commercial check 1 and 23 crosses over commercial check 2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Reddy and Patel (2015).

Fruit yield per hectare varied in genotypes and ranged from 9.73 (SG-1) to 14.67 kg (SG-3) among lines, 10.28 (Mangundi Local) to 14.94 kg (Hospet Local) among testers and 10.14 (SG-4× Mangundi Local) to 18.93 kg (SG-4 × Hospet Local) among crosses. The cross SG-4 × Hospet Local showed positive heterosis over better parent (26.66%), over best parent (26.68%), over commercial check 1 (97.85%) and over commercial check 2 (108.85%). Out of 27 crosses, 17 crosses over better parent, 19 crosses over best parent, 18 over commercial check 1 and 23 crosses over commercial check-2 exhibited significant heterosis in the desirable direction which were found to be similar with the results by Reddy and Patel (2015).

Table 1 : *Per se* performance of parents and crosses for growth parameters in Sponge gourd

Sl. No.	Genotypes	Vine length (m)	Number of branches	Leaf area (cm^2)	Leaf area index
1.	SG-4 × Hospet Local	6.75	8.00	136.00	7.20
2.	SG-4 × Dharwad Local	6.00	7.20	132.00	5.80
3.	SG-4× Mangundi Local	4.46	4.30	85.70	2.90
4.	SG-3× Hospet Local	6.35	7.94	132.20	7.10
5.	SG-3× Dharwad Local	3.81	3.30	122.30	5.90
6.	SG-3× Mangundi Local	4.38	5.20	96.50	3.10
7.	SG-6 × Hospet Local	3.79	7.30	124.20	6.50
8.	SG-6 × Dharwad Local	6.23	3.40	129.00	6.30
9.	SG-6 × Mangundi Local	4.60	5.60	91.50	3.10
10.	KRCCH × Hospet Local	3.85	7.60	129.00	5.90
11.	KRCCH × Dharwad Local	3.87	3.80	126.00	6.30
12.	KRCCH × Mangundi Local	4.38	5.00	91.80	3.60
13.	SG-5 × Hospet Local	3.96	7.60	129.00	6.60
14.	SG-5 × Dharwad Local	3.89	3.70	127.00	6.20
15.	SG-5 × Mangundi Local	4.55	5.10	94.90	3.10
16.	KRCCH-5× Hospet Local	6.32	7.40	127.00	6.30
17.	KRCCH-5× Dharwad Local	3.86	4.10	131.00	6.50
18.	KRCCH-5× Mangundi Local	4.55	4.80	95.20	3.40
19.	SG-2× Hospet Local	3.81	7.80	132.00	6.40
20.	SG-2× Dharwad Local	3.85	4.70	123.30	6.40
21.	SG-2× Mangundi Local	4.58	5.50	102.50	2.80
22.	KRCCH-3× Hospet Local	3.85	7.60	127.00	5.10
23.	KRCCH-3× Dharwad Local	3.97	4.00	127.00	4.50
24.	KRCCH-3× Mangundi Local	4.70	5.00	91.70	2.80
25.	SG-1 × Hospet Local	3.94	7.20	127.00	6.40
26.	SG-1× Dharwad Local	3.88	4.20	102.00	2.90
27.	SG-1× Mangundi Local	4.40	5.00	93.20	3.10

Table 1. ***Contd…***

Sl. No.	Genotypes	Vine length (m)	Number of branches	Leaf area (cm^2)	Leaf area index
Lines					
1	SG-4	4.38	4.50	93.70	4.20
2	SG-3	3.70	5.30	90.00	3.80
3	SG-6	4.17	4.40	100.70	2.30
4	KRCCH	4.02	4.50	88.70	2.20
5	SG-5	3.71	4.20	94.40	2.90
6	KRCCH-5	4.09	5.10	91.80	2.60
7	SG-2	3.76	5.20	107.00	2.70
8	KRCCH-3	3.90	4.90	73.60	2.70
9	SG-1	3.82	4.30	101.20	2.40
Testers					
1	Hospet Local	5.42	6.40	122.40	5.00
2	Dharwad Local	4.75	5.40	109.20	4.70
3	Mangundi Local	4.10	4.40	97.80	3.50
Commercial check					
1	Pusa Sneha (CC1)	4.59	4.20	123.70	5.30
2	Pusa chikini (CC 2)	4.65	4.10	128.50	5.50
	SEm ±	0.15	0.41	5.29	0.41
	CD at 5%	0.4	1.16	15.12	1.17
	CD at 1%	0.5	1.56	20.24	1.56

Table 2 : Per cent heterosis over better parent (BP), best parent (BTP) and commercial checks (CC) for growth and flowering parameters in sponge gourd

Sl. No.	Crosses	Vine length				Number of branches			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	24.90**	13.73*	-14.84**	-27.14**	24.00**	-11.9**	-9.76	-41.22**
2	SG-4 × Dharwad Local	10.00**	9.80	-10.97*	-23.83**	16.00**	-7.14**	-4.88	-38.05**
3	SG-4× Mangundi Local	-17.71**	-2.83	-4.09	-17.94**	-25.00**	14.29**	17.07	-23.75**
4	SG-3× Hospet Local	16.97**	15.25**	16.34**	-28.43**	23.00**	-9.52**	-7.32	-39.63**
5	SG-3× Dharwad Local	-7.07**	-16.99**	18.06**	-29.90**	-37.74**	-21.43**	-19.51	47.58**
6	SG-3× Mangundi Local	-19.19**	-4.58	-5.81	-19.41**	-18.75*	23.81**	26.83*	-17.39*
7	SG-6 × Hospet Local	-10.61**	-17.43**	-18.49**	-30.27**	13.00**	-14.29**	-12.20	42.81**
8	SG-6 × Dharwad Local	14.76**	16.12**	-17.20**	-29.16**	-22.73*	-19.05**	-17.07	-45.99**
9	SG-6 × Mangundi Local	-15.13**	0.22	-1.08	-15.36**	-12.5	33.33**	36.59**	-11.04
10	KRCCH × Hospet Local	-9.20**	-16.12**	-17.20**	-29.16**	18.00**	2.38**	4.88	-31.69**
11	KRCCH × Dharwad Local	-5.61**	-15.69**	-16.77**	-28.79**	-15.56	-9.52**	-7.32	-39.63**
12	KRCCH × Mangundi Local	-19.19**	-4.58	-5.81	-19.41**	-21.87**	19.05**	21.95*	-20.57**
13	SG-5 × Hospet Local	-6.60**	-13.73*	-14.84**	-27.14**	18.00**	19.05**	21.95*	-20.57**
14	SG-5 × Dharwad Local	-5.12**	-15.25**	-16.34**	-28.43**	-15.91	-11.90**	-9.76	-41.22**
15	SG-5 × Mangundi Local	-16.05**	-0.87	-2.15	-16.28**	-20.31**	21.43**	24.39*	-18.98*
16	KRCCH-5× Hospet Local	16.00**	20.26**	-21.29**	-32.66**	17.00**	11.90*	14.63	-25.34**
17	KRCCH-5× Dharwad Local	-5.85**	-15.90**	-16.99**	-28.98**	-19.61*	-2.38*	0.00	-34.87**
18	KRCCH-5× Mangundi Local	-16.05**	-0.87	-2.15	-16.28**	-25.00**	14.29**	17.07	-23.75**
19	SG-2× Hospet Local	-10.14**	-16.99**	-18.06**	-29.90**	21.00**	2.38*	4.88	-31.69**
20	SG-2× Dharwad Local	-6.10**	16.12**	-17.20**	-29.16**	-7.84	11.90**	14.63	-25.34**
21	SG-2× Mangundi Local	-15.50**	-0.22	-1.51	-15.73**	-14.06*	30.95**	34.15**	-12.63
22	KRCCH-3× Hospet Local	-9.20**	-16.12**	-17.20**	-29.16**	18.00**	11.90**	14.63	-25.34**
23	KRCCH-3× Dharwad Local	-3.17**	-13.51*	-14.62**	-26.95**	-18.37*	-4.76	-2.44	-36.46**
24	KRCCH-3× Mangundi Local	-13.28**	2.40	1.08	-13.52**	-21.87**	19.05**	21.95*	-20.57**
25	SG-1 × Hospet Local	-7.08**	-14.16**	-15.27**	-27.51**	16.00**	2.38**	4.88	-31.69**
26	SG-1× Dharwad Local	-5.37**	-15.47**	-16.56**	-28.61**	-4.55	0.00	2.44	-33.28**
27	SG-1× Mangundi Local	-18.82**	-4.14	-5.38	-19.04**	-21.87**	19.05**	21.95*	-20.57**
	SEm ±	0.233	0.233	0.233	0.233	0.438	0.438	0.438	0.438
	CD @ 5%	0.479	0.479	0.479	0.479	0.899	0.899	0.899	0.899
	CD @ 1%	0.647	0.647	0.647	0.647	1.216	1.216	1.216	1.216

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively

BP= Better parents CC 1= Pusa Sneha

BTP= Best parent CC 2= Pusa chikini

Table 2. ***Contd…***

Sl. No	Crosses	Leaf area				Leaf area index			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	11.11**	28.27**	-13.11**	-31.21**	24.00**	54.80**	-26.00**	-51.43**
2	SG-4 × Dharwad Local	20.88**	26.10**	-21.02**	-37.48**	23.40**	43.9**	8.70	-28.57**
3	SG-4× Mangundi Local	-12.37**	-13.8**	1.18	-19.91**	-30.95**	-12.0**	26.09**	-17.14**
4	SG-3× Hospet Local	8.01**	26.21**	-16.88**	-34.21**	42.00**	54.20**	-13.04	-42.86**
5	SG-3× Dharwad Local	12.00**	20.24**	3.78	-17.85**	25.53**	44.90**	17.39*	-22.86**
6	SG-3× Mangundi Local	-1.33	-1.07	13.93**	-9.81	-18.42**	-4.80**	34.78**	-11.43*
7	SG-6 × Hospet Local	1.47	21.46**	-13.11**	-31.21**	30.00**	50.00**	0.00	-34.29**
8	SG-6 × Dharwad Local	18.13**	24.38**	7.56*	-14.86*	34.04**	48.40**	34.78**	-11.43*
9	SG-6 × Mangundi Local	-9.14	-6.602*	8.03**	-14.49*	-11.43**	-4.80**	34.78**	-11.43*
10	KRCCH × Hospet Local	5.39*	24.38**	-6.49	-25.98**	18.00**	44.90**	-13.04	-42.86**
11	KRCCH × Dharwad Local	15.38**	22.58**	-11.33**	-29.81**	34.04**	48.40**	21.74*	-20.00**
12	KRCCH × Mangundi Local	-6.13	-6.25*	8.38**	-14.21*	2.86**	9.72**	56.52**	2.86
13	SG-5 × Hospet Local	5.39*	24.38**	-3.54	-23.64**	32.00**	50.70**	-21.74*	-48.57**
14	SG-5 × Dharwad Local	16.30**	23.19**	-5.43	-25.14**	31.91**	47.50**	21.74*	-20.00**
15	SG-5 × Mangundi Local	-2.97	-2.78	12.04**	-11.31	-11.43**	-4.83**	34.78**	-11.43*
16	KRCCH-5× Hospet Local	3.76	23.19**	-10.27**	-28.97**	26.00**	48.40**	-8.70	-40.00**

17	KRCCH-5× Dharwad Local	19.96**	25.54**	-4.25	-24.21**	38.30**	50.00**	34.78**	-11.43 *
18	KRCCH-5× Mangundi Local	-2.66	-2.45	12.4**	-11.03	-2.86**	4.40**	47.83**	-2.86
19	SG-2× Hospet Local	7.84**	26.10**	-10.04**	-28.79**	28.00**	49.20**	-21.74 *	-48.57**
20	SG-2× Dharwad Local	12.91**	20.89**	-0.47	-21.21**	36.17**	49.20**	-4.35	-37.14**
21	SG-2× Mangundi Local	-4.21	4.83	21.02**	-4.21	-20.00**	-16.00**	21.74 *	-20.00**
22	KRCCH-3× Hospet Local	3.76	23.19**	-10.98**	-29.53**	2.00**	36.20**	-13.04	-42.86**
23	KRCCH-3× Dharwad Local	16.30**	23.19**	-7.32*	-26.64**	-4.26**	27.70**	26.09**	-17.14**
24	KRCCH-3× Mangundi Local	-6.24*	-6.37	8.26**	-14.30 *	-20.00**	-16.00**	-8.70	-40.00**
25	SG-1 × Hospet Local	3.76	23.19**	-4.13	-24.11**	28.00**	49.20**	-8.70	-40.00**
26	SG-1× Dharwad Local	-6.59*	4.370	-6.85*	-26.26**	-38.30**	-12.00**	26.09**	-17.14**
27	SG-1× Mangundi Local	-7.91**	-4.65	10.04**	-12.90 *	-11.43**	-4.80	34.78**	-11.43 *
	SEm ±	1.270	1.270	1.270	1.270	0.190	0.190	0.190	0.190
	CD @ 5%	5.900	5.900	5.900	5.900	0.390	0.390	0.390	0.390
	CD @ 1%	7.440	7.440	7.440	7.440	0.530	0.530	0.530	0.530

Note: * and** indicate significance at values at p=0.05 and p=0.01, respectively

BP= Better parents CC 1= Pusa Sneha

BTP= Best parent CC 2= Pusa Chikini

Table 3 : *Per se* performance of parents and crosses for flowering and yield parameters in sponge gourd

Sl. No	Genotypes	Node at which first male flower appears	Node at which first female flower appears	Days to first male flowering	Days to first female flowering	Days to first harvest	Days to last harvest
	Crosses						
1	SG-4 × Hospet Local	3.50	9.40	28.40	33.90	48.10	79.60
2	SG-4 × Dharwad Local	3.50	9.30	30.20	39.50	45.30	83.40
3	SG-4× Mangundi Local	5.20	14.00	38.10	48.90	54.60	89.00
4	SG-3× Hospet Local	4.50	12.90	28.20	37.80	47.60	80.90
5	SG-3× Dharwad Local	4.80	12.30	27.80	38.80	47.10	82.30
6	SG-3× Mangundi Local	4.90	14.70	37.80	47.20	49.70	86.90
7	SG-6 × Hospet Local	3.40	9.10	27.10	37.50	45.10	82.50
8	SG-6 × Dharwad Local	3.60	9.40	26.80	37.50	48.00	83.10
9	SG-6 × Mangundi Local	4.10	12.80	38.80	46.30	55.50	89.50
10	KRCCH × Hospet Local	4.50	13.00	27.60	34.80	47.30	81.60
11	KRCCH × Dharwad Local	4.70	13.90	27.30	36.40	48.20	81.80
12	KRCCH × Mangundi Local	4.90	12.80	37.90	50.00	53.70	87.10
13	SG-5 × Hospet Local	4.60	12.80	24.50	36.00	48.10	82.30
14	SG-5 × Dharwad Local	4.80	13.20	27.20	39.20	46.20	83.40
15	SG-5 × Mangundi Local	4.60	12.40	38.30	48.10	54.00	88.80
16	KRCCH-5× Hospet Local	3.40	11.40	24.50	37.20	46.60	80.40
17	KRCCH-5× Dharwad Local	3.70	11.20	27.10	36.80	47.40	82.50
18	KRCCH-5× Mangundi Local	4.40	12.70	42.20	48.50	55.00	91.40
19	SG-2× Hospet Local	4.80	12.10	25.80	37.20	46.60	85.50
20	SG-2× Dharwad Local	4.70	12.50	26.00	38.80	46.40	83.70
21	SG-2× Mangundi Local	4.70	12.80	40.70	48.60	55.30	90.50
22	KRCCH-3× Hospet Local	5.10	13.10	27.20	37.60	46.40	81.80
23	KRCCH-3× Dharwad Local	4.70	12.00	24.90	37.00	51.00	84.40
24	KRCCH-3× Mangundi Local	5.20	12.10	48.10	47.70	54.80	87.90
25	SG-1 × Hospet Local	4.10	13.40	42.30	35.00	47.70	83.50
26	SG-1× Dharwad Local	4.50	12.80	39.60	36.30	47.60	82.10
27	SG-1× Mangundi Local	4.20	13.40	43.20	47.60	51.10	86.60

Table 3. contd…

Sl.	Genotypes	Node at	Node at	Days to first	Days to first	Days to first	Days to last

No.		which first male flower appears	which first female flower appears	male flowering	female flowering	harvest	harvest
	Lines						
1	SG-4	6.70	16.30	34.30	45.10	53.70	88.10
2	SG-3	4.20	12.40	45.30	47.90	53.50	87.90
3	SG-6	5.20	12.90	44.00	47.00	55.20	87.90
4	KRCCH	4.40	13.80	43.30	48.40	56.00	83.70
5	SG-5	4.70	12.30	44.50	45.40	48.30	89.40
6	KRCCH-5	5.10	13.10	44.90	46.60	52.50	88.40
7	SG-2	4.40	12.70	43.50	46.80	54.40	83.10
8	KRCCH-3	4.40	12.60	47.70	48.00	54.00	87.50
9	SG-1	4.20	12.70	43.70	48.90	54.70	86.30
	Testers						
1	Hospet Local	6.30	13.10	42.00	45.10	54.00	87.30
2	Dharwad Local	5.30	12.00	45.00	47.90	54.60	86.90
3	Mangundi Local	4.60	14.60	51.40	56.00	62.70	91.70
	Commercial checks						
1	Pusa Sneha (CC 1)	5.30	15.00	32.20	38.60	51.10	86.50
2	Pusa Chikini (CC 2)	6.30	15.10	30.30	38.50	50.40	86.10
	SEm ±	0.28	0.70	1.50	1.08	1.27	2.23
	CD at 5%	0.79	2.01	4.29	3.09	3.63	6.38
	CD at 1%	1.06	2.6	5.73	4.13	3.63	3.63

Table 4 : Per cent heterosis over better parent (BP), best parent (BTP) and commercial checks (CC) for growth and flowering parameters in sponge gourd

Sl. No.	Crosses	Node at which first male flower appears				Node at which first female flower appears			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	-47.76**	-33.96**	-44.44**	-16.67*	-42.33**	-37.33**	-37.75**	-21.67**
2	SG-4 × Dharwad Local	-47.76**	-33.96**	-44.44**	-16.67*	-42.94**	-38.00**	-38.41**	-22.50**
3	SG-4× Mangundi Local	-22.39**	-1.89	-17.46**	23.81**	-14.11**	-6.67	-7.28	16.67*
4	SG-3× Hospet Local	-28.57**	-15.09**	-28.57**	7.14	-1.53	-14.00**	-14.57**	7.50
5	SG-3× Dharwad Local	-9.43	-9.43	-23.81**	14.29*	-0.81	-18.00**	-18.54**	2.50
6	SG-3× Mangundi Local	6.52	-7.55	-22.22**	16.67*	0.68	-2.00	-2.65	22.50**
7	SG-6 × Hospet Local	-46.03**	-35.85**	-46.03**	-19.05**	-30.53**	-39.33**	-39.74**	-24.17**
8	SG-6 × Dharwad Local	-32.08**	-32.08**	-42.86**	-14.29*	-27.13**	-37.33**	-37.75**	-21.67**
9	SG-6 × Mangundi Local	-21.15**	-22.64**	-34.92**	-2.38	-12.33*	-14.67**	-15.23**	6.67
10	KRCCH × Hospet Local	-28.57**	-15.09**	-28.57**	7.14	-5.8	-13.33*	-13.91**	8.33
11	KRCCH × Dharwad Local	-11.32*	-11.32*	-25.40**	11.90	0.72	-7.33	-7.95	15.83*
12	KRCCH × Mangundi Local	6.52	-7.55	-22.22**	16.67*	-12.33*	-14.67**	-15.23**	6.67
13	SG-5 × Hospet Local	-26.98**	-13.21*	-26.98**	9.52	-2.29	-14.67**	-15.23**	6.67
14	SG-5 × Dharwad Local	-9.43	-9.43	-23.81**	14.29*	7.32	-12.00*	-12.58*	10.00
15	SG-5 × Mangundi Local	-2.13	-13.21*	-26.98**	9.52	-15.07**	-17.33**	-17.88**	3.33
16	KRCCH-5× Hospet Local	-46.03**	-35.85**	-46.03**	-19.05**	-12.98*	-24.00**	-24.50**	-5.00
17	KRCCH-5× Dharwad Local	-30.19**	-30.19**	-41.27**	-11.90	-14.50*	-25.33**	-25.83**	-6.67
18	KRCCH-5× Mangundi Local	-13.73*	-16.98**	-30.16**	4.76	-13.01*	-15.33**	-15.89**	5.83
19	SG-2× Hospet Local	-23.81**	-9.43	-23.81**	14.29*	-7.63	-19.33**	-19.87**	0.83
20	SG-2× Dharwad Local	-11.32*	-11.32*	-25.40**	11.90	-1.57	-16.67**	-17.22**	4.17
21	SG-2× Mangundi Local	2.17	-11.32*	-25.40**	11.90	-12.33*	-14.67**	-15.23**	6.67
22	KRCCH-3× Hospet Local	-19.05**	-3.77	-19.05**	21.43**	0.00	-12.67*	-13.25*	9.17
23	KRCCH-3× Dharwad Local	-11.32*	-11.32*	-25.40**	11.90	-4.76	-20.00**	-20.53**	0.00
24	KRCCH-3× Mangundi Local	13.04*	-1.89	-17.46**	23.81**	-17.12**	-19.33**	-19.87**	0.83
25	SG-1 × Hospet Local	-34.92**	-22.64**	-34.92**	-2.38	2.29	-10.67*	-11.26*	11.67
26	SG-1× Dharwad Local	-15.09**	-15.09**	-28.57**	7.14	0.79	-14.67**	-15.23**	6.67

27	SG-1× Mangundi Local	-8.70	-20.75**	-33.33**	0.00	-8.22	-10.67 *	-11.26 *	11.67
	SEm ±	0.256	0.256	0.256	0.256	0.752	0.752	0.752	0.752
	CD @ 5%	0.526	0.526	0.526	0.526	1.545	1.545	1.545	1.545
	CD @ 1%	0.711	0.711	0.711	0.711	2.089	2.089	2.089	2.089

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 4. *Contd…*

Sl. No.	Crosses	Days to first male flowering				Days to first female flowering			
		BP	**BTP**	**CC 1**	**CC 2**	**BP**	**BTP**	**CC 1**	**CC 2**
1	SG-4 × Hospet Local	-32.38**	-32.38**	-6.27	-17.20 *	-29.81**	-12.18**	-11.95**	-24.83**
2	SG-4 × Dharwad Local	-32.89**	-32.89**	-0.33	-11.95	-19.22**	2.33	2.6	-12.42 *
3	SG-4× Mangundi Local	-25.88**	-25.88**	25.74**	11.08	-10.77 *	26.68**	27.01**	8.43
4	SG-3× Hospet Local	-37.75**	-37.75**	-6.93	-17.78**	-21.74**	-2.07	-1.82	-16.19**
5	SG-3× Dharwad Local	-38.63**	-38.63**	-8.25**	-18.95**	-20.65**	0.52	0.78	-13.97 *
6	SG-3× Mangundi Local	-26.46**	-26.46**	24.75**	10.20	-13.87**	22.28**	22.60**	4.66
7	SG-6 × Hospet Local	-38.41**	-38.41**	-10.56**	-20.99**	-22.36**	-2.85	-2.60	-16.85**
8	SG-6 × Dharwad Local	-40.44**	-40.44**	-11.55	-21.87**	-23.31**	-2.85	-2.60	-16.85**
9	SG-6 × Mangundi Local	-24.51**	-24.51**	28.05**	13.12	-15.51**	19.95**	20.26**	2.66
10	KRCCH × Hospet Local	-36.26**	-36.26**	-8.91	-19.53**	-28.10**	-9.84**	-9.61	-22.84**
11	KRCCH × Dharwad Local	-39.33**	-39.33**	-9.90	-20.41**	-25.56**	-5.70	-5.45	-19.29**
12	KRCCH × Mangundi Local	-26.26**	-26.26**	25.08**	10.50	-8.76	29.53**	29.87**	10.86
13	SG-5 × Hospet Local	-44.94**	-44.94**	-19.14 *	-28.57**	-25.47**	-6.74*	-6.49	-20.18**
14	SG-5 × Dharwad Local	-39.56**	-39.56**	-10.23	-20.70**	-19.84**	1.55	1.82	-13.08 *
15	SG-5 × Mangundi Local	-25.49**	-25.49**	26.40**	11.66	-12.23**	24.61**	24.94**	6.65
16	KRCCH-5× Hospet Local	-45.43**	-45.43**	-19.14 *	-28.57**	-22.98**	-3.63	-3.38	-17.52**
17	KRCCH-5× Dharwad Local	-39.78**	-39.78**	-10.56	-20.99**	-24.74**	-4.66	-4.42	-18.40**
18	KRCCH-5× Mangundi Local	-17.90**	-17.90**	39.27**	23.03**	-11.50 *	25.65**	25.97**	7.54
19	SG-2× Hospet Local	-40.69**	-40.69**	-14.85	-24.78**	-22.98**	-3.63	-3.38	-17.52**
20	SG-2× Dharwad Local	-42.22**	-42.22**	-14.19	-24.20**	-20.65**	0.52	0.78	-13.97 *
21	SG-2× Mangundi Local	-20.82**	-20.82**	34.32**	18.66**	-11.31 *	25.91**	26.23**	7.76
22	KRCCH-3× Hospet Local	-42.98**	-42.98**	-10.23	-20.70**	-22.15**	-2.59	-2.34	-16.63**
23	KRCCH-3× Dharwad Local	-47.80**	-47.80**	-17.82 *	-27.41**	-24.34**	-4.15	-3.90	-17.96**
24	KRCCH-3× Mangundi Local	-6.42	-6.42	58.75**	40.23**	-12.96**	23.58**	23.90**	5.76
25	SG-1 × Hospet Local	-3.20	-3.20	39.60**	23.32**	-28.43**	-9.33**	-9.09	-22.39**
26	SG-1× Dharwad Local	-12.00 *	-12.00 *	30.69**	15.45 *	-25.77**	-5.96	-5.71	-19.51**
27	SG-1× Mangundi Local	-15.95**	-15.95**	42.57**	25.95**	-13.14**	23.32**	23.64**	5.54
	SEm ±	2.194	2.194	2.194	2.194	2.40	2.40	2.40	2.40
	CD @ 5%	4.510	4.510	4.510	4.510	4.94	4.94	4.94	4.94
	CD @ 1%	6.096	6.096	6.096	6.096	6.68	6.68	6.68	6.68

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 4. ***contd…***

Sl. No.	Crosses	Days to first harvest				Days to last harvest			
		BP	**BTP**	**CC 1**	**CC 2**	**BP**	**BTP**	**CC 1**	**CC 2**
1	SG-4 × Hospet Local	-10.93**	-13.23**	6.55 *	2.29	-9.65**	-9.73**	10.81**	7.34**
2	SG-4 × Dharwad Local	-17.03**	-20.23**	5.95 *	1.71	-5.33**	-4.73**	7.08 *	3.73*
3	SG-4× Mangundi Local	-12.92**	0.24	8.33**	4.00	-2.94*	1.85	7.20 *	3.85*
4	SG-3× Hospet Local	-11.85**	-14.42**	12.30**	7.81**	-7.96**	-7.97**	8.70**	5.29**
5	SG-3× Dharwad Local	-13.74**	-15.64**	8.33**	4.00	-6.37**	-6.13**	5.96 *	2.65*
6	SG-3× Mangundi Local	-20.73**	-9.590**	8.73**	4.38	-5.23**	-0.51	7.95**	4.57*
7	SG-6 × Hospet Local	-18.30**	-20.76**	9.52**	5.14 *	-6.14**	-5.87**	5.22	1.93
8	SG-6 × Dharwad Local	-13.04**	-13.47**	11.11**	6.67**	-5.46**	-5.11**	6.46 *	3.13*
9	SG-6 × Mangundi Local	-11.48**	1.86	10.12**	5.71 *	-2.40*	2.40*	4.10	0.84
10	KRCCH × Hospet Local	-6.61	-15.15**	4.96	0.76	-6.53**	-7.04**	7.58 *	4.21*

11	KRCCH × Dharwad Local	-13.93**	-13.00**	7.94**	3.62	-5.87**	-6.78**	4.35	1.08
12	KRCCH × Mangundi Local	-14.35**	-1.42	6.55*	2.29	-5.02**	-0.28	1.86	-1.32
13	SG-5 × Hospet Local	-1.67	-13.23**	5.75*	1.52	-7.94**	-6.13**	2.24	-0.96
14	SG-5 × Dharwad Local	-15.38**	-17.89**	7.54**	3.24	-6.71**	-4.73*	6.96*	3.61*
15	SG-5 × Mangundi Local	-13.88**	-0.86	7.14**	2.86	-3.16*	1.63	3.98	0.72
16	KRCCH-5× Hospet Local	-13.70**	-16.88**	5.95*	1.71	-9.05**	-8.64**	9.94**	6.50**
17	KRCCH-5× Dharwad Local	-13.19**	-14.90**	7.54**	3.24	-6.67**	-5.87**	8.94**	5.54**
18	KRCCH-5× Mangundi Local	-12.28**	0.969	9.13**	4.76	-0.33	4.43*	13.54**	9.99**
19	SG-2× Hospet Local	-14.34**	-16.88**	9.52**	5.14*	-2.06*	-2.16*	11.30**	7.82**
20	SG-2× Dharwad Local	-15.02**	-17.38**	8.13**	3.81	-3.68*	-4.36*	10.56**	7.10**
21	SG-2× Mangundi Local	-11.80**	1.506	9.72**	5.33*	-1.31	3.48*	5.59	2.29*
22	KRCCH-3× Hospet Local	-14.07**	-17.38**	8.53**	4.19	-6.51*	-6.78**	5.22	1.93
23	KRCCH-3× Dharwad Local	-6.59	-6.79	9.33**	4.95*	-3.54*	-3.49*	6.46*	3.13*
24	KRCCH-3× Mangundi Local	-11.80**	0.608	8.73**	4.38	-4.14*	0.62	5.47	2.17*
25	SG-1 × Hospet Local	-12.80*	-14.18**	7.94**	3.62	-4.35*	-4.6*	7.33*	3.97*
26	SG-1× Dharwad Local	-12.98*	-14.42**	10.32**	5.90*	-5.52**	-6.39**	6.96*	3.61*
27	SG-1× Mangundi Local	-18.50**	-6.588**	9.13**	4.76	-5.56**	-0.86	7.58*	4.21*
	SEm ±	2.710	2.710	2.710	2.710	1.490	1.490	1.490	1.490
	CD @ 5%	5.570	5.570	5.570	5.570	2.110	2.110	2.110	2.110
	CD @ 1%	7.530	7.530	7.530	7.530	4.910	4.910	4.910	4.910

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 5 : *Per se* performance of parents and crosses for growth and flowering parameters in sponge gourd

Sl. No.	Genotypes	Sex ratio	Per cent fruit set	Days to 50% flowering
1.	SG-4 × Hospet Local	22.10	70.90	46.50
2.	SG-4 × Dharwad Local	22.50	72.10	46.60
3.	SG-4× Mangundi Local	15.90	64.90	52.40
4.	SG-3× Hospet Local	22.50	72.50	45.80
5.	SG-3× Dharwad Local	21.10	73.40	47.30
6.	SG-3× Mangundi Local	16.30	64.10	53.70
7.	SG-6 × Hospet Local	22.60	73.10	45.10
8.	SG-6 × Dharwad Local	22.40	74.60	46.20
9.	SG-6 × Mangundi Local	17.60	64.50	52.60
10.	KRCCH × Hospet Local	22.50	73.00	46.10
11.	KRCCH × Dharwad Local	21.90	73.40	47.00
12.	KRCCH × Mangundi Local	18.70	63.80	52.20
13.	SG-5 × Hospet Local	22.70	72.10	45.50
14.	SG-5 × Dharwad Local	22.20	73.60	49.40
15.	SG-5 × Mangundi Local	17.60	66.20	48.90
16.	KRCCH-5× Hospet Local	22.90	74.20	46.20
17.	KRCCH-5× Dharwad Local	22.30	73.00	45.90
18.	KRCCH-5× Mangundi Local	17.30	64.20	51.60
19.	SG-2× Hospet Local	21.60	72.90	45.50
20.	SG-2× Dharwad Local	22.30	72.90	46.60
21.	SG-2× Mangundi Local	17.10	64.90	51.50
22.	KRCCH-3× Hospet Local	22.70	73.30	46.70
23.	KRCCH-3× Dharwad Local	22.70	70.50	46.30
24.	KRCCH-3× Mangundi Local	18.00	66.20	52.40
25.	SG-1 × Hospet Local	23.20	73.10	47.40
26.	SG-1× Dharwad Local	21.80	70.80	45.30
27.	SG-1× Mangundi Local	15.20	65.80	50.70

Table 5. ***Contd …***

Sl. No.	Genotypes	Sex ratio	Per cent fruit set	Days to 50% flowering
	Lines			
1	SG-4	13.50	63.00	53.00
2	SG-3	14.80	54.70	52.50
3	SG-6	14.30	59.70	54.10
4	KRCCH	14.60	60.50	52.70
5	SG-5	15.60	58.50	51.80
6	KRCCH-5	15.20	56.90	49.20
7	SG-2	16.10	64.60	53.90
8	KRCCH-3	15.30	62.10	52.90
9	SG-1	14.80	62.50	52.70
	Testers			
1	Hospet Local	20.50	61.70	21.80
2	Dharwad Local	18.30	62.90	20.30
3	Mangundi Local	18.10	55.80	19.30
	Commercial check			
1	Pusa Sneha (CC 1)	12.80	59.60	15.80
2	Pusa Chikini (CC 2)	13.80	59.50	16.10
	SEm ±	1.01	1.33	0.69
	CD at 5%	2.90	3.79	1.97
	CD at 1%	3.88	5.07	2.64

Table 6 : Per cent heterosis over better parent (BP), best parent (BTP) and commercial checks (CC) for growth and flowering parameters in sponge gourd

Sl. No.	Crosses	Days to 50% flowering			
		BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	-12.26**	-9.18**	-10.92**	-15.42**
2	SG-4 × Dharwad Local	-12.08**	-8.98**	-10.73**	-15.24**
3	SG-4× Mangundi Local	-4.73	2.34	0.38	-4.69
4	SG-3× Hospet Local	-12.76**	-10.55**	-12.26**	-16.70**
5	SG-3× Dharwad Local	-9.90**	-7.62*	-9.39**	-13.97*
6	SG-3× Mangundi Local	-2.36	4.88	2.87	-2.33
7	SG-6 × Hospet Local	-16.64**	-11.9**	-13.60**	-17.97**
8	SG-6 × Dharwad Local	-14.60**	-9.77	-11.49**	-15.97**
9	SG-6 × Mangundi Local	-4.36	2.73	0.77	-4.33
10	KRCCH × Hospet Local	-12.52**	-9.96**	-11.69**	-16.15**
11	KRCCH × Dharwad Local	-10.82**	-8.20	-9.96	-14.51*
12	KRCCH × Mangundi Local	-5.09	1.95	0.00	-5.06
13	SG-5 × Hospet Local	-12.16**	-11.13**	-12.84**	-17.24**
14	SG-5 × Dharwad Local	-4.63	-3.52	-5.36	-10.15
15	SG-5 × Mangundi Local	-11.09**	-4.49	-6.32	-11.06*
16	KRCCH-5× Hospet Local	-7.23	-9.77	-11.49**	-15.97**
17	KRCCH-5× Dharwad Local	-10.53**	-10.30**	-12.07**	-16.52**
18	KRCCH-5× Mangundi Local	-6.18	0.78	-1.15	-6.15
19	SG-2× Hospet Local	-15.58**	-11.10**	-12.84**	-17.24**
20	SG-2× Dharwad Local	-13.54**	-8.98	-10.73**	-15.24**
21	SG-2× Mangundi Local	-6.36	0.59	-1.34	-6.33
22	KRCCH-3× Hospet Local	-11.72**	-8.79**	-10.54**	-15.06**
23	KRCCH-3× Dharwad Local	-12.48**	-9.57**	-11.3**	-15.79**
24	KRCCH-3× Mangundi Local	-4.73	2.34	0.38	-4.69
25	SG-1 × Hospet Local	-10.06	-7.42	-9.20	-13.79*
26	SG-1× Dharwad Local	-14.04**	-11.50**	-13.22*	-17.61**
27	SG-1× Mangundi Local	-7.82	-0.98	-2.87	-7.78
	SEm ±	2.931	2.931	2.931	2.931
	CD @ 5%	6.025	6.025	6.025	6.025
	CD @ 1%	8.144	8.144	8.144	8.144

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 6. ***Contd …***

Sl. No.	Crosses	Sex ratio				Per cent fruit set			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	7.80**	7.80**	72.66**	60.14**	12.54**	18.96*	19.16*	9.5
2	SG-4 × Dharwad Local	22.95**	9.76**	75.78**	63.04**	14.44**	20.97**	21.18**	11.35
3	SG-4× Mangundi Local	-12.15**	-22.44**	24.22*	15.22	3.02	8.89	9.08	0.23
4	SG-3× Hospet Local	9.76**	9.76**	75.78**	63.04**	17.50**	21.64**	21.85**	11.97
5	SG-3× Dharwad Local	15.30**	2.93	64.84**	52.90**	16.69**	23.15**	23.36**	13.36
6	SG-3× Mangundi Local	-9.94**	-20.49**	27.34*	18.12	14.87**	7.55	7.73	-1.00
7	SG-6 × Hospet Local	10.24**	10.24**	76.56**	63.77**	18.48**	22.65**	22.86**	12.9
8	SG-6 × Dharwad Local	22.40**	9.27**	75.00**	62.32**	18.60**	25.17**	25.38**	15.21*
9	SG-6 × Mangundi Local	-2.76	-14.15	37.50**	27.54*	8.04**	8.22	8.40	-0.39
10	KRCCH × Hospet Local	9.76**	9.76**	75.78**	63.04**	18.31**	22.48**	22.69**	12.74
11	KRCCH × Dharwad Local	19.67**	6.83**	71.09**	58.70**	16.69**	23.15**	23.36**	13.36
12	KRCCH × Mangundi Local	3.31*	-8.78	46.09**	35.51**	5.45	7.05	7.23	-1.47
13	SG-5 × Hospet Local	10.73**	10.73**	77.34**	64.49**	16.86**	20.97**	21.18**	11.35
14	SG-5 × Dharwad Local	21.31**	8.29**	73.44**	60.87**	17.01**	23.49**	23.70**	13.67
15	SG-5 × Mangundi Local	-2.76	-14.15	37.50**	27.54*	13.16**	11.07	11.26	2.24
16	KRCCH-5× Hospet Local	11.71**	11.71**	78.91**	65.94**	20.26**	24.50**	24.71**	14.59*
17	KRCCH-5× Dharwad Local	21.86**	8.78**	74.22**	61.59**	16.06**	22.48**	22.69**	12.74
18	KRCCH-5× Mangundi Local	-4.42**	-15.61*	35.16**	25.36*	12.83**	7.72	7.90	-0.85
19	SG-2× Hospet Local	5.37**	5.37**	68.75**	56.52**	12.85**	22.32**	22.52**	12.59
20	SG-2× Dharwad Local	21.86**	8.78**	74.22**	61.59**	12.85**	22.32**	22.52**	12.59
21	SG-2× Mangundi Local	-5.52	-16.59*	33.59**	23.91*	0.46	8.89	9.08	0.23
22	KRCCH-3× Hospet Local	10.73**	10.73**	77.34**	64.49**	18.04**	22.99**	23.19**	13.2
23	KRCCH-3× Dharwad Local	24.04**	10.73**	77.34**	64.49**	12.08**	18.29*	18.49*	8.88
24	KRCCH-3× Mangundi Local	-0.55	-12.20	40.63**	30.43**	6.60	11.07	11.26	2.24
25	SG-1 × Hospet Local	13.17**	13.17**	81.25**	68.12**	16.96**	22.65**	22.86**	12.9
26	SG-1× Dharwad Local	19.13**	6.34**	70.31**	57.97**	12.56**	18.79*	18.99*	9.34
27	SG-1× Mangundi Local	-16.02**	-25.85**	18.75	10.14	5.28	10.4	10.59	1.62
	SEm ±	1.461	1.461	1.461	1.461	4.328	4.328	4.328	4.328
	CD @ 5%	3.004	3.004	3.004	3.004	8.897	8.897	8.897	8.897
	CD @ 1%	4.061	4.061	4.061	4.061	12.027	12.027	12.027	12.027

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 7 : *Per se* performance of parents and crosses for yield parameters in sponge gourd

Sl. No.	Genotypes	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	Number of fruits per vine	Fruit yield per vine (kg)
1.	SG-4 × Hospet Local	23.60	6.40	146.00	14.00	2.04
2.	SG-4 × Dharwad Local	22.60	5.80	139.00	12.20	1.70
3.	SG-4× Mangundi Local	18.90	3.50	110.60	9.90	1.10
4.	SG-3× Hospet Local	22.80	5.60	141.20	12.20	1.73
5.	SG-3× Dharwad Local	22.60	4.60	142.70	11.40	1.62
6.	SG-3× Mangundi Local	19.20	3.60	115.10	10.50	1.20
7.	SG-6 × Hospet Local	23.10	5.60	139.00	13.40	1.86
8.	SG-6 × Dharwad Local	22.20	5.40	143.00	12.20	1.74
9.	SG-6 × Mangundi Local	18.50	3.50	116.70	10.50	1.23
10.	KRCCH × Hospet Local	23.40	5.80	138.50	13.10	1.81
11.	KRCCH × Dharwad Local	22.20	5.00	134.00	13.10	1.75
12.	KRCCH × Mangundi Local	18.50	3.90	120.20	10.50	1.27
13.	SG-5 × Hospet Local	22.20	5.60	138.00	13.10	1.81
14.	SG-5 × Dharwad Local	20.70	5.60	132.50	12.60	1.67
15.	SG-5 × Mangundi Local	19.30	3.90	115.20	10.90	1.25
16.	KRCCH-5× Hospet Local	22.60	5.50	138.40	13.50	1.87

17.	KRCCH-5× Dharwad Local	21.90	5.50	136.00	12.60	1.71
18.	KRCCH-5× Mangundi Local	18.90	3.90	116.10	11.20	1.30
19.	SG-2× Hospet Local	23.10	5.80	134.30	13.30	1.79
20.	SG-2× Dharwad Local	23.30	5.70	133.00	13.50	1.80
21.	SG-2× Mangundi Local	20.20	3.60	113.60	10.40	1.18
22.	KRCCH-3× Hospet Local	23.50	4.90	129.10	11.80	1.52
23.	KRCCH-3× Dharwad Local	22.40	4.30	134.00	11.50	1.54
24.	KRCCH-3× Mangundi Local	18.90	3.50	111.90	9.70	1.09
25.	SG-1 × Hospet Local	22.50	4.60	140.50	13.20	1.85
26.	SG-1× Dharwad Local	21.70	3.20	133.80	12.10	1.62
27.	SG-1× Mangundi Local	19.00	3.60	113.10	11.00	1.24

Table 7. ***Contd…***

Sl. No.	Genotypes	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	Number of fruits per vine	Fruit yield per vine (kg)
	Lines					
1	SG-4	20.80	4.00	125.10	11.50	1.44
2	SG-3	21.60	3.60	132.00	12.00	1.58
3	SG-6	20.40	3.80	133.00	11.40	1.52
4	KRCCH	19.30	4.00	125.30	11.60	1.45
5	SG-5	20.10	3.60	120.50	10.80	1.30
6	KRCCH-5	20.80	3.50	126.00	10.80	1.36
7	SG-2	20.40	3.40	125.10	10.40	1.30
8	KRCCH-3	20.50	3.50	121.30	10.80	1.31
9	SG-1	20.10	3.80	114.10	9.20	1.05
	Testers					
1	Hospet Local	21.80	5.60	131.20	12.30	1.61
2	Dharwad Local	20.30	4.50	131.00	11.00	1.44
3	Mangundi Local	19.30	3.70	118.20	9.40	1.11
	Commercial check					
1	Pusa Sneha (CC 1)	15.80	5.00	116.10	8.90	1.03
2	Pusa Chikini (CC 2)	16.10	4.80	116.40	8.40	0.98
	SEm ±	0.69	0.39	2.60	0.59	0.08
	CD at 5%	1.97	1.11	7.45	1.67	0.24
	CD at 1%	2.64	1.48	9.96	2.24	0.32

Table 8 : Per cent heterosis over better parent (BP), best parent (BTP) and commercial checks (CC) for Yield parameters in sponge gourd

Sl. No.	Crosses	Fruit length				Fruit diameter			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	8.26**	13.34**	32.30**	2.40*	14.29**	38.80**	53.85**	0.00
2	SG-4 × Dharwad Local	8.65**	9.513**	30.43**	0.96	28.89**	32.47**	38.46**	-10.00
3	SG-4× Mangundi Local	-9.13**	-8.20**	24.84**	-3.37**	-12.50**	-11.9**	46.15**	-5.00
4	SG-3× Hospet Local	-80.95**	10.30**	29.19**	0.00	0.00	30.05**	42.31**	-7.50
5	SG-3× Dharwad Local	-81.12**	9.51**	30.43**	0.96	2.22**	14.85**	46.15**	-5.00
6	SG-3× Mangundi Local	-83.96**	-6.51**	27.33**	-1.44	-2.70**	-8.79**	38.46**	-10.00
7	SG-6 × Hospet Local	5.96**	11.47**	33.54**	3.37**	-7.14**	30.05**	42.31**	-7.50
8	SG-6 × Dharwad Local	8.82**	7.88**	31.68**	1.92	22.22**	27.46**	46.15**	-5.00
9	SG-6 × Mangundi Local	-9.31**	-10.54**	30.43**	0.96	-5.26**	-11.9**	34.62**	-12.50*
10	KRCCH × Hospet Local	7.34**	12.60**	32.92**	2.88**	8.93**	32.47**	38.46**	-10.00
11	KRCCH × Dharwad Local	9.36**	7.88**	37.89**	6.73**	8.89**	21.66**	53.85**	0.00
12	KRCCH × Mangundi Local	-4.15**	-10.54**	30.43**	0.96	-5.00**	-0.42	50.00**	-2.50
13	SG-5 × Hospet Local	1.83	7.88**	31.68**	1.92	0.00	30.05**	46.15**	-5.00
14	SG-5 × Dharwad Local	1.97	1.20	28.57**	-0.48	13.33**	30.05**	30.77**	-15.00*
15	SG-5 × Mangundi Local	-3.98**	-5.95**	31.06**	1.44	2.70**	-0.42	50.00**	-2.50
16	KRCCH-5× Hospet Local	3.67**	9.51**	34.78**	4.33**	-1.79	28.78**	42.31**	-7.50

17	KRCCH-5× Dharwad Local	5.29**	6.62**	27.33**	-1.44	22.22**	28.78**	34.62**	-12.50*
18	KRCCH-5× Mangundi Local	-9.13**	-8.20**	33.54**	3.37**	-5.41**	-0.42	30.77**	-15.00*
19	SG-2× Hospet Local	5.96**	11.47**	25.47**	-2.88**	0.00	32.47**	38.46**	-10.00
20	SG-2× Dharwad Local	14.22**	12.2**	31.06**	1.44	31.11**	31.28**	42.31**	-7.50
21	SG-2× Mangundi Local	-0.98	-1.23	31.68**	1.92	16.22**	-8.79**	38.46**	-10.00
22	KRCCH-3× Hospet Local	7.80**	12.97**	25.47**	-2.88**	-14.29**	20.06**	34.62**	-12.50*
23	KRCCH-3× Dharwad Local	9.27**	8.70**	36.65**	5.77**	-2.22**	8.91**	26.92**	-17.50**
24	KRCCH-3× Mangundi Local	-7.80**	-8.20**	29.19**	0.00	-10.81**	-11.9**	34.62**	-12.50*
25	SG-1 × Hospet Local	3.21**	9.10**	34.78**	4.33**	-12.50**	14.85**	30.77**	-15.00*
26	SG-1× Dharwad Local	6.90**	5.76**	26.09**	-2.4*	-8.89**	-22.3**	23.08*	-20.00**
27	SG-1× Mangundi Local	-5.47**	-7.63**	18.01*	-8.65**	-5.26**	-8.79**	38.46**	-10.00
	SEm ±	1.030	1.030	1.030	1.030	0.690	0.690	0.690	0.690
	CD @ 5%	2.120	2.120	2.120	2.120	1.420	1.420	1.420	1.420
	CD @ 1%	2.870	2.870	2.870	2.870	1.920	1.920	1.920	1.920

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 8. ***Contd …***

Sl. No.	Crosses	Average fruit weight			
		BP	**BTP**	**CC 1**	**CC 2**
1	SG-4 × Hospet Local	11.28**	9.77**	25.75**	25.43**
2	SG-4 × Dharwad Local	6.11*	4.51	19.72**	19.42**
3	SG-4× Mangundi Local	-11.59**	-16.84**	-4.74	-4.98
4	SG-3× Hospet Local	6.97*	6.17**	21.62**	21.31**
5	SG-3× Dharwad Local	8.11**	7.29**	22.91**	22.59**
6	SG-3× Mangundi Local	-12.80**	-13.46**	-0.86	-1.12
7	SG-6 × Hospet Local	4.51	4.51	19.72**	19.42**
8	SG-6 × Dharwad Local	7.52**	7.52**	23.17**	22.85**
9	SG-6 × Mangundi Local	-12.26**	-12.26**	0.52	0.26
10	KRCCH × Hospet Local	5.56	4.14	19.29**	18.99**
11	KRCCH × Dharwad Local	2.29	0.75	15.42**	15.12**
12	KRCCH × Mangundi Local	-4.07	-9.62**	3.53	3.26
13	SG-5 × Hospet Local	5.18	3.76	18.86**	18.56**
14	SG-5 × Dharwad Local	1.15	-0.38	14.13**	13.83**
15	SG-5 × Mangundi Local	-4.40	-13.38**	-0.78	-1.03
16	KRCCH-5× Hospet Local	5.49	4.06	19.21**	18.90**
17	KRCCH-5× Dharwad Local	3.82	2.26	17.14**	16.84**
18	KRCCH-5× Mangundi Local	-7.86*	-12.71**	0.00	-0.26
19	SG-2× Hospet Local	2.36	0.98	15.68**	15.38**
20	SG-2× Dharwad Local	1.53	0.00	14.56**	14.26**
21	SG-2× Mangundi Local	-9.19**	-14.59**	-2.15	-2.41
22	KRCCH-3× Hospet Local	-1.60	-2.93	11.20**	10.91**
23	KRCCH-3× Dharwad Local	2.29	0.75	15.42**	15.12**
24	KRCCH-3× Mangundi Local	-7.75*	-15.86**	-3.62	-3.87
25	SG-1 × Hospet Local	7.09**	5.64	21.02**	20.70**
26	SG-1× Dharwad Local	2.14	0.60	15.25**	14.95**
27	SG-1× Mangundi Local	-4.31	-14.96**	-2.58	-2.84
	SEm ±	3.720	3.720	3.720	3.720
	CD @ 5%	6.650	6.650	6.650	6.650
	CD @ 1%	7.000	7.340	7.000	7.000

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 8. ***Contd…***

Sl. No.	Crosses	Number of fruits per vine				Fruit yield per vine			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	13.82**	13.82**	57.30**	66.67**	26.32**	26.32**	97.10**	108.16**
2	SG-4 × Dharwad Local	6.09**	-0.81	37.08**	45.24**	17.71**	4.95**	63.77**	72.96**
3	SG-4× Mangundi Local	-13.91**	-19.51**	11.24	17.86	23.96**	32.20**	5.80	11.73
4	SG-3× Hospet Local	-0.81	-0.81	37.08**	45.24**	6.81**	6.81**	66.67**	76.02**
5	SG-3× Dharwad Local	-5.00**	-7.32**	28.09**	35.71**	2.53	0.31	56.52**	65.31**
6	SG-3× Mangundi Local	-12.50**	-14.63**	17.98	25.00*	-24.05**	25.70**	15.94	22.45
7	SG-6 × Hospet Local	8.94**	8.94**	50.56**	59.52**	15.17**	15.17**	79.71**	89.80**
8	SG-6 × Dharwad Local	7.02**	-0.81	37.08**	45.24**	14.85**	7.74**	68.12**	77.55**
9	SG-6 × Mangundi Local	-7.89**	-14.63**	17.98	25.00*	-19.14**	24.15**	18.36	25.00
10	KRCCH × Hospet Local	6.50**	6.50**	47.19**	55.95**	12.07**	12.07**	74.88**	84.69**
11	KRCCH × Dharwad Local	12.93**	6.50**	47.19**	55.95**	20.62**	8.67**	69.57**	79.08**
12	KRCCH × Mangundi Local	-9.48**	-14.63**	17.98	25.00*	-12.71**	21.36**	22.71	29.59*
13	SG-5 × Hospet Local	6.50**	6.50**	47.19**	55.95**	12.07**	12.07**	74.88**	84.69**
14	SG-5 × Dharwad Local	14.55**	2.44**	41.57**	50.00**	15.97**	3.41**	61.35**	70.41**
15	SG-5 × Mangundi Local	0.93	-11.38**	22.47*	29.76**	-3.83**	22.29**	21.26	28.06*
16	KRCCH-5× Hospet Local	9.76**	9.76**	51.69**	60.71**	15.79**	15.79**	80.68**	90.82**
17	KRCCH-5× Dharwad Local	14.55**	2.44**	41.57**	50.00**	19.10**	6.19**	65.70**	75.00**
18	KRCCH-5× Mangundi Local	3.70	-8.94**	25.84*	33.33**	-4.76**	-19.50**	25.60*	32.65*
19	SG-2× Hospet Local	8.13**	8.13**	49.44**	58.33**	10.53**	10.53**	72.46**	82.14**
20	SG-2× Dharwad Local	22.73**	9.76**	51.69**	60.71**	25.00**	11.46**	73.91**	83.67**
21	SG-2× Mangundi Local	0.00	-15.45**	16.85	23.81*	-9.23**	26.93**	14.01	20.41
22	KRCCH-3× Hospet Local	-4.07	-4.07**	32.58**	40.48**	-5.88**	-5.88	46.86**	55.10**
23	KRCCH-3× Dharwad Local	4.55**	-6.50**	29.21**	36.90**	6.94**	-4.64	48.79**	57.14**
24	KRCCH-3× Mangundi Local	-10.19	-21.14**	8.99	15.48	-17.18**	32.82**	4.83	10.71
25	SG-1 × Hospet Local	7.32**	7.32**	48.31**	57.14**	14.86**	14.86**	79.23**	89.29**
26	SG-1× Dharwad Local	10.00**	-1.3	35.96**	44.05**	12.15**	0.00	56.04**	64.80**
27	SG-1× Mangundi Local	17.02**	-10.57**	23.60*	30.95**	12.16**	22.91**	20.29	27.04*
	SEm ±	0.840	0.840	0.840	0.840	0.119	0.119	0.119	0.119
	CD @ 5%	1.728	1.728	1.728	1.728	0.246	0.246	0.246	0.246
	CD @ 1%	2.336	2.336	2.336	2.336	0.332	0.332	0.332	0.332

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Table 9 : *Per se* performance of parents and crosses for yield parameters in sponge gourd

Sl. No.	Genotypes	Fruit yield per plot(kg)	Fruit yield per hectare (tonnes)
1.	SG-4 × Hospet Local	18.40	18.93
2.	SG-4 × Dharwad Local	15.26	15.70
3.	SG-4× Mangundi Local	9.86	10.14
4.	SG-3× Hospet Local	15.55	16.00
5.	SG-3× Dharwad Local	14.62	15.04
6.	SG-3× Mangundi Local	10.84	11.15
7.	SG-6 × Hospet Local	16.77	17.25
8.	SG-6 × Dharwad Local	15.69	16.14
9.	SG-6 × Mangundi Local	11.04	11.36
10.	KRCCH × Hospet Local	16.33	16.80
11.	KRCCH × Dharwad Local	15.79	16.24
12.	KRCCH × Mangundi Local	11.44	11.77
13.	SG-5 × Hospet Local	16.27	16.74
14.	SG-5 × Dharwad Local	15.02	15.46
15.	SG-5 × Mangundi Local	11.29	11.62
16.	KRCCH-5× Hospet Local	16.82	17.30
17.	KRCCH-5× Dharwad Local	15.42	15.87

18.	KRCCH-5× Mangundi Local	11.69	12.03
19.	SG-2× SG-2× Hospet Local	16.07	16.54
20.	SG-2× Dharwad Local	16.16	16.62
21.	SG-2× Mangundi Local	10.66	10.97
22.	KRCCH-3× Hospet Local	13.69	14.09
23.	KRCCH-3× Dharwad Local	13.87	14.27
24.	KRCCH-3× Mangundi Local	9.78	10.06
25.	SG-1 × Hospet Local	16.69	17.17
26.	SG-1× Dharwad Local	14.57	14.99
27.	SG-1× Mangundi Local	11.20	11.52

Table 9. ***Contd…***

Sl. No.	Genotypes	Fruit yield per plot(kg)	Fruit yield per hectare (tonnes)
	Lines		
1	SG-4	12.95	13.33
2	SG-3	14.26	14.67
3	SG-6	13.65	14.05
4	KRCCH	13.08	13.46
5	SG-5	11.71	12.05
6	KRCCH-5	12.25	12.60
7	SG-2	11.71	12.04
8	KRCCH-3	11.79	12.13
9	SG-1	9.45	9.73
	Testers		
1	Hospet Local	14.52	14.94
2	Dharwad Local	12.97	13.34
3	Mangundi Local	10.00	10.28
	Commercial check		
1	Pusa Sneha (CC 1)	9.30	9.56
2	Pusa Chikini (CC 2)	8.81	9.06
	SEm ±	0.75	0.78
	CD at 5%	2.15	2.22
	CD at 1%	2.88	2.96

Table 10 : Per cent heterosis over better parent (BP), best parent (BTP) and commercial checks (CC) for yield sponge gourd

Sl. No.	Crosses	Fruit yield per plot				Fruit yield per hectare			
		BP	BTP	CC 1	CC 2	BP	BTP	CC 1	CC 2
1	SG-4 × Hospet Local	26.68**	26.68**	97.85**	108.85**	26.66**	26.68**	97.85**	108.85**
2	SG-4 × Dharwad Local	17.66**	5.06	64.09**	73.21**	17.69**	5.06**	64.09**	73.21**
3	SG-4× Mangundi Local	-23.93**	-32.15**	5.97	11.86	-23.90**	-32.15**	5.97	11.86
4	SG-3× Hospet Local	7.06**	7.06**	67.20**	76.50**	7.03**	7.06**	67.20**	76.50**
5	SG-3× Dharwad Local	2.49	0.62	57.15**	65.89**	2.49	0.62	57.15**	65.89**
6	SG-3× Mangundi Local	-23.98**	-25.37**	16.56	23.04	-23.96**	-25.37**	16.56	23.04
7	SG-6 × Hospet Local	15.42**	15.42*	80.27**	90.30**	15.42**	15.42**	80.27**	90.30**
8	SG-6 × Dharwad Local	14.98**	8.06**	68.76**	78.15**	14.95**	8.06**	68.76**	78.15**
9	SG-6 × Mangundi Local	-19.12*	-23.99**	18.71	25.31*	-19.12**	-23.99**	18.71	25.31*
10	KRCCH × Hospet Local	12.43**	12.43**	75.59**	85.36**	12.41**	12.43**	75.59**	85.36**
11	KRCCH × Dharwad Local	20.68**	8.67**	69.73**	79.17**	20.65**	8.67**	69.73**	79.17**
12	KRCCH × Mangundi Local	-12.50	-21.20**	23.06	29.91*	-12.56**	-21.20**	23.06	29.91*
13	SG-5 × Hospet Local	12.01**	12.01**	74.95**	84.68**	11.98**	12.01**	74.95**	84.68**
14	SG-5 × Dharwad Local	15.81**	3.41**	61.51**	70.49**	15.85**	3.41	61.51**	70.49**
15	SG-5 × Mangundi Local	-3.63	-22.27**	21.40	28.15*	-3.61**	-22.27**	21.40	28.15*
16	KRCCH-5× Hospet Local	15.77**	15.77**	80.81**	90.86**	15.76**	15.77**	80.81**	90.86**
17	KRCCH-5× Dharwad Local	18.93**	6.20**	65.86**	75.09**	18.97**	6.20**	65.86**	75.09**
18	KRCCH-5× Mangundi Local	-4.49	-19.48*	25.75*	32.75*	-4.56**	-19.48**	25.75*	32.75*

19	SG-2× Hospet Local	10.67**	10.67**	72.85**	82.46**	10.64**	10.67**	72.85**	82.46**
20	SG-2× Dharwad Local	24.60**	11.26**	73.76**	83.43**	24.63**	11.26**	73.76**	83.43**
21	SG-2× Mangundi Local	-8.97	-26.61**	14.62	21.00	-8.97**	-26.61**	14.62	21.00
22	KRCCH-3× Hospet Local	-5.71	-5.71	47.26**	55.45**	-5.72**	-5.71**	47.26**	55.45**
23	KRCCH-3× Dharwad Local	6.94**	-4.51	49.14**	57.43**	6.97**	-4.51**	49.14**	57.43**
24	KRCCH-3× Mangundi Local	-17.13	-32.70**	5.11	10.95	-17.14**	-32.70**	5.11	10.95
25	SG-1 × Hospet Local	14.87**	14.87**	79.41**	89.39**	14.85**	14.87**	79.41**	89.39**
26	SG-1× Dharwad Local	12.34**	0.31	56.67**	65.38**	12.37**	0.31	56.67**	65.38**
27	SG-1× Mangundi Local	12.01**	-22.93**	20.38	27.07*	12.01**	-22.93**	20.38	27.07*
	SEm ±	1.080	1.080	1.080	1.080	1.080	1.080	1.080	1.080
	CD @ 5%	2.220	2.220	2.220	2.220	2.220	2.220	2.220	2.220
	CD @ 1%	3.001	3.001	3.001	3.001	3.001	3.001	3.001	3.001

Note: * and ** indicate significance at values at p=0.05 and p=0.01, respectively
BP= Better parents CC 1= Pusa Sneha
BTP= Best parent CC 2= Pusa Chikini

Conclusions

Based on mean performance, the top three promising crosses for marketable yield per plant were SG-4 × Hospet Local (2.04 kg), SG-6 × Hospet Local (1.86 kg) and SG-1 × Hospet Local (1.85 kg). The hybrids namely, SG-4 × Hospet Local, SG-6 × Hospet Local and SG-1 × Hospet Local were best for earliness and yield parameters, the hybrids namely SG-4 × Hospet Local, SG-6 × Hospet Local and SG-1 × Hospet Local were best for quality parameters and also expressed significant and desirable best parent heterosis and standard heterosis for the major traits. Thus, these hybrids can be exploited in practical plan breeding for selection of better transgressive segregants and they may also be exploited through heterosis breeding programme in order to achieve hybrids with high fruit yield.

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