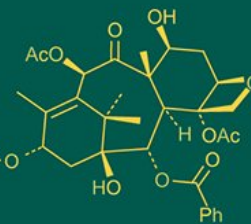
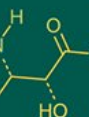
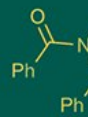


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Performance of parental lines and derived hybrids for yield and its attributing traits of sponge gourd [*Luffa cylindrica* L. (Roem)]

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Abstract

The present investigation entitled "Performance of parental lines and derived hybrids for yield and its attributing traits of sponge gourd" was conducted at vegetable research farm, Department of Vegetable Science, Banda University of Agriculture & Technology, Banda to evaluate the mean performance of parental genotypes and hybrids under spring-summer and rainy season for studied traits. Eight diversified parental genotypes of sponge gourd were cross in half diallel fashion to produce 28 F₁ which were evaluated in randomized block design with three replications. The analysis of variance of mean value was significant for all observed traits indicating that significance variance was available in parents and hybrid's mean. The best performing hybrids were Ken Swadisht × K. Divya (8.10) and K. Jyoti × K. Vandana (12.50) for node to 1st female flower; Pusa Supriya × K. Divya (46.00 days) and K. Shreya × K. Divya (37.62 days) for days to 1st female flower emergence; K. Shreya × K. Divya (51.95 and 44.50 days) for earliest fruit harvest and Ken Swadisht × K. Jyoti (198.55 q/ha) and K. Jyoti × Pusa Supriya (244.64 q/ha) for total yield per hectare, for spring-summer and rainy season.

Keywords: Sponge gourd, mean performance, hybrids, earliness, total yield

Introduction

Sponge gourd, also as 'Smooth gourd, bath sponge, dish-cloth gourd is a popular vegetable of tropical and sub-tropical regions. In India, it occupies large cultivation area in Northern region where it grows on commercial scale as well as in kitchen garden. There, it is important part of crop rotation for small and large scale farmers and sown in summer and rainy season. The major sponge gourd producing states are Uttar Pradesh, West Bangal, Bihar, Assam, Andra Pradesh and Tamil Nadu.

Sponge gourd is a monoecious vine which produces deep yellow flowers (male and female flowers separately) at every node. Male flowers occur early than female flower in a cluster form called receme while female presents solitary and can be easily distinguish due to tiny miniature fruit which attached below flower petals.

It is cultivated for its tender immature fruit which can either be consumed as cooked, fried or used in soup. Its seed oil which is colourless, odorless and tasteless, used in cooking is a good source of protein, unsaturated fatty acid and can be used as powerful antioxidant. The mature dried fruit have a dense network of fiber, made up of cellulose, hemicellulose and lignin, used as industrial fiber for preparing of bathing sponge, packaging material, cushioning material, commercial filters and shoe sole. Sponge gourd is been use in traditional medicine since ancient time. It is used for treatment of various infections, including arthritis, cancer, inflammatory diseases, diarrhea and viral diseases (Abdel-Salam *et al.* 2019) ^[1].

Despite its diverse application, not much focus is given for improvement of its horticultural traits. As a result, only a limited number of varieties and hybrids are cultivated in India. Because of its monoecious and cross-pollinated nature, exploitation of hybrid vigour can be done easily in this crop for improvement. Keeping this in view, the present investigation was undertaken to study mean performance of hybrids in respect of their parents over two variable seasons.

Materials and Methods

Eight diverse released varieties collected from various institutes of India were used as parents and 28 F₁ hybrids were developed using half diallel mating design during summer season 2024 at Vegetable Research Farm, Banda University of Agriculture & Technology, Banda. These 28 F₁ hybrids along with 8 parents were evaluated in randomized block design with three replication for various growth and yield related traits during spring-summer and rainy season 2025. All the cultural practices were adopted to raise a healthy crop. Five plants per plot were selected randomly for collecting data on eleven parameters viz. days to 50% germination, node to first male flower emergence, node to first female flower emergence, days to first male flower emergence, days to first female flower emergence, days to 1st fruit harvest, fruit length, fruit girth, fruit weight, yield per plant and yield per hectare.

Results and Discussion

The mean performance of all parents and hybrids was noted significant for all studied traits revealing that all the parents were genetically diverse and have potential to use in breeding programme. The mean value of 8 parents and 28 F₁ hybrids were presented in table 1, 2, 3 and 4. An examination on mean performance of all 36 genotypes indicated that for days to 50% germination, the mean value among parents ranged from 7.33 (K. Divya) to 11.00 days (Ken Swadisht) and 5.00 (K. Kalyani) to 7.00 days (K. Jyoti) whereas in hybrids, it varied from 6.00 to 11.00 days and 3.33 to 7.00 days, the hybrids which took least days to germinate were Ken Swadisht × Panjab Nikhar (5 days) and, Panjab Nikhar × K. Vandana (3.33 days), K. Kalyani × K. Divya (3.33 days) for spring-summer and rainy season, respectively. these results are in accordance with Khairiya *et al.* (2023) [5] who also noticed a range of 5.33 to 8.00 for parents and 5.00 to 6.67 days in hybrids for germination of seeds.

Node to 1st male flower's mean ranged from 5.50 (K. Jyoti) to 7.10 (Panjab Nikhar) and 9.03 (K. Jyoti) to 12.78 (Pusa Supriya) for parental genotypes while for hybrids, from 4.30 (Ken Swadisht × K. Kalyani) to 7.53 (Panjab Nikhar × K. Jyoti) and 8.22 (K. Kalyani × Pusa Supriya and K. Shreya × K. Divya) to 12.11 (Panjab Nikhar × K. Vandana) for both spring-summer and rainy season, sub-sequencely. Chauhan *et al.* (2018) [3] also noticed 4.33 to 10.67 number node for 1st male flower emergence in their parental lines meanwhile 3.67 to 12.67 number node in hybrids. In parental genotypes, 1st female flower node occurs at 10.30 (K. Jyoti) to 15.90 (Pusa Supriya) and 14.83 (K. Kalyani) to 17.32 (K. Shreya) meanwhile among hybrids, 1st female flower node occurred at 8.10 (Ken Swadisht × K. Divya) to 14.80 (Panjab Nikhar × K. Jyoti) and 12.50 to 17.67 (Panjab Nikhar × K. Shreya) during spring-summer and rainy season, respectively. This result confined with Chauhan *et al.* (2018) [3] as they also reported 12th node to 26.67th node in parents while 9th node to 23.67th node in hybrids for 1st female flower emergence.

The characters such as lowest nodes to male-female flower and minimum days to male-female occurs are all contribute in early crop production, thus are desirable for selection to develop an early variety. Data pertaining to days to 1st male flower emergence diverge 47.17 (K. Divya) to 54.26 days (K. Jyoti) among parents, in hybrids, ranged from 39.93 (K. Shreya × K. Divya) to 60.30 days (K. Vandana × Panjab

nikhar). In rainy season, K. Kalyani (41.00) took minimum days while Pusa Supriya (45.83) took maximum days for 1st male flower emergence within parents while hybrid, Panjab Nikhar × K. Kalyani (34.83) took least days. Days to 1st female flower emergence varied from 53.23 (K. Divya) to 61.10 (K. Kalyani) and 45.33 (K. Shreya) to 50.93 (Ken Swadisht) in parents for spring-summer and rainy season, respectively and, among hybrids, 46.00 (Pusa Supriya × K. Divya) to 61.47 days (K. Kalyani × K. Shreya) and 37.62 (K. Shreya × K. Divya) to 51.37 days (Panjab Nikhar × K. Jyoti) for spring-summer and rainy season, respectively. Days to 1st fruit harvest for spring-summer season varied from 60.11 (K. Divya) to 68.57 days (K. Kalyani) in parents, whereas the hybrids ranged from 51.95 (K. Shreya × K. Divya) to 71.02 days (K. Kalyani × K. Shreya). For rainy season, in parental genotype, K. Shreya and K. Vandana (51.50) received 1st fruit harvest in least days whereas Ken Swadisht took maximum days (56.17) while hybrids, K. Shreya × K. Divya and Ken Swadisht × Pusa Supriya took minimum days to 1st fruit pick (44.50 days) and K. Kalyani × K. Divya took maximum (57.13 days).

The mean of inter-nodal length for spring-summer season varied from 7.25 (K. Kalyani) to 8.81 cm (K. Vandana) for parents. Among hybrids, its value varied from 5.91 (Ken Swadisht × Pusa Supriya) to 9.22 cm (K. Kalyani × Pusa Supriya) while in rainy season, it ranged 9.85 (K. Jyoti) to 11.58 cm (K. Vandana) in parental genotypes whereas hybrid, Ken Swadisht × K. Divya (8.18 cm) expressed least internode distance.

Data pertaining to fruit length diverge from 21.52 (Panjab Nikhar) to 17.19 cm (Kashi Divya) and 25.66 (Panjab Nikhar) to 19.33 cm (Kashi Shreya) for parents meanwhile 27.20 (Ken Swadisht × Kashi Jyoti) to 16.55 cm (Kashi Kalyani × Kashi Divya) and 34.56 (Panjab Nikhar × Kashi Shreya) to 19.56 cm (Pusa Supriya × Kashi Shreya) for hybrids for both spring-summer and rainy season, respectively. The fruit girth of sponge gourd varied from 12.24 (Panjab Nikhar) to 9.69 cm (Kashi Jyoti) and 14.05 (Kashi Vandana) to 11.80 cm (Kashi Shreya) for parents whereas from 14.22 (Ken Swadisht × Kashi Jyoti) to 10.42 cm (Kashi Kalyani × Pusa Supriya) and 15.78 (Ken Swadisht × Kashi Jyoti) to 11.26 cm (Kashi Vandana × Kashi Divya) for hybrids, for spring-summer and rainy season, respectively. Mean of fruit weight exhibited from 124.70 (Panjab Nikhar) to 102.67 g (Kashi Kalyani) and 153.19 (Panjab Nikhar) to 123.70 g (Kashi Divya) within parental genotypes for sub-sequenced seasons while hybrids, Panjab Nikhar × Pusa Supriya (135.26 and 181.10 g) expressed maximum fruit weight and Kashi Vandana × Kashi Shreya (94.83 g) and Pusa Supriya × Kashi Shreya (119.06 g) minimum for spring-summer and rainy season, respectively. The significant differences observed among parents and hybrids across both seasons suggest the presence of considerable genetic variation for fruit length, girth and weight which may be exploited in breeding programmes aimed at improving this trait.

Yield per plant considered most economic trait. In this study, fruit yield per plant ranged from 1.88 (Pusa Supriya) to 1.26 kg (Kashi Shreya and Kashi Kalyani) and, 3.53 (Panjab Nikhar) to 2.25 kg (Kashi Kalyani) in parental genotypes nevertheless in hybrids, 2.26 (Ken Swadisht × Kashi Jyoti) to 0.94 kg (Kashi Vandana × Kashi Shreya and Kashi Jyoti × Kashi Divya) and, 4.89 (Kashi Jyoti × Pusa

Supriya) to 2.01 kg (Ken Swadisht × Kashi Divya) for spring-summer and rainy season, respectively.

Overall, the differential performance of the genotypes and crosses across seasons indicates substantial phenotypic variability for fruit yield per plant and suggests a possible influence of genotype × environment interaction on the expression of this trait. For yield per hectare, significant differences observed among the parental genotypes and their cross combinations in both seasons, indicating considerable genetic variability for this trait. The highest yield per hectare was recorded by Pusa Supriya (165.64 q/ha) and Panjab Nikhar (176.45 q/ha) while lowest Kashi Shreya (110.48 q/ha) and Kashi Kalyani (112.53 q/ha) among parents meanwhile in hybrids, Ken Swadisht × Kashi Jyoti (198.55 q/ha) and Kashi Jyoti × Pusa Supriya (244.64 q/ha)

exhibited highest yield per hectare whereas Kashi Vandana × Kashi Shreya (82.68 q/ha) and Ken Swadisht × Kashi Divya (100.28 q/ha) lowest for both sub-sequenced seasons. for earliness trait, (Kashi Shreya × Kashi Divya) in both season and Ken Swadisht × Pusa Supriya in rainy season produce early yield. For total yield per hectare, (Ken Swadisht × Kashi Jyoti) for spring-summer season and Kashi Jyoti × Pusa Supriya in rainy season, were the most promising hybrids. These hybrids can be recommended for cultivation in northern plains to catch early crop and maximum production. Similar result for superiority of hybrids conferred by Islam *et al.* (2008) ^[4], Singh *et al.* (2009) ^[7], Chauhan *et al.* (2018) ^[3], Bhardwaj and Kumar (2021) ^[2] and Khairiya *et al.* (2023) ^[5] in sponge gourd, Srakar *et al.* (2015) ^[6] in ridge gourd.

Table 1: Mean performance of 8 parents and 28 hybrids for DG, NFME and NFFE for spring-summer and rainy season

Sl. No.	Notation	Parents/F ₁	DG		NFME		NFFE	
			SS	Rainy	SS	Rainy	SS	Rainy
1.	P ₁	K. Divya	7.33	5.33	6.10	11.11	11.30	15.67
2.	P ₂	K. Shreya	7.67	6.33	6.87	11.67	12.10	17.32
3.	P ₃	Pusa Supriya	10.00	6.33	6.27	12.78	15.90	16.78
4.	P ₄	K. Vandana	12.00	6.00	6.90	10.22	13.90	15.26
5.	P ₅	K. Jyoti	8.00	7.00	5.50	9.03	10.30	15.17
6.	P ₆	K. Kalyani	8.33	5.00	6.83	9.78	12.20	14.83
7.	P ₇	Panjab Nikhar	10.00	5.33	7.10	11.78	11.70	15.50
8.	P ₈	Ken Swadisht	11.00	5.67	5.87	9.55	10.40	15.33
9.	P ₂ × P ₁	K. Shreya × K. Divya	10.00	4.33	6.27	8.22	11.40	16.33
10.	P ₃ × P ₁	Pusa Supriya × K. Divya	7.00	5.00	6.50	9.33	14.40	16.33
11.	P ₃ × P ₂	Pusa Supriya × K. Shreya	8.00	4.33	5.60	9.78	9.30	13.00
12.	P ₄ × P ₁	K. Vandana × K. Divya	7.67	4.33	5.17	9.44	11.10	16.67
13.	P ₄ × P ₂	K. Vandana × K. Shreya	6.67	6.67	6.80	10.33	13.80	17.17
14.	P ₄ × P ₃	K. Vandana × Pusa Supriya	7.67	5.33	5.90	9.33	12.40	16.00
15.	P ₅ × P ₁	K. Jyoti × K. Divya	6.33	4.00	4.70	8.33	8.60	13.08
16.	P ₅ × P ₂	K. Jyoti × K. Shreya	9.00	6.33	6.30	10.50	13.00	15.83
17.	P ₅ × P ₃	K. Jyoti × Pusa Supriya	8.67	4.00	5.83	9.89	13.50	16.17
18.	P ₅ × P ₄	K. Jyoti × K. Vandana	8.00	5.00	4.90	9.44	11.00	12.50
19.	P ₆ × P ₁	K. Kalyani × K. Divya	9.00	3.33	4.50	8.78	11.13	16.17
20.	P ₆ × P ₂	K. Kalyani × K. Shreya	11.00	4.33	6.27	8.56	11.80	14.33
21.	P ₆ × P ₃	K. Kalyani × Pusa Supriya	6.33	4.33	6.87	8.22	13.00	14.50
22.	P ₆ × P ₄	K. Kalyani × K. Vandana	7.00	5.00	6.50	11.22	10.00	12.61
23.	P ₆ × P ₅	Panjab Nikhar × K. Jyoti	8.00	5.00	5.10	9.22	14.20	13.17
24.	P ₇ × P ₁	Panjab Nikhar × K. Divya	9.67	5.00	5.30	9.89	11.50	14.83
25.	P ₇ × P ₂	Panjab Nikhar × K. Shreya	9.33	6.33	7.50	11.44	11.10	17.67
26.	P ₇ × P ₃	Panjab Nikhar × Pusa Supriya	9.33	4.33	6.90	9.56	12.40	15.33
27.	P ₇ × P ₄	Panjab Nikhar × K. Vandana	8.00	3.33	6.20	12.11	14.00	16.67
28.	P ₇ × P ₅	Panjab Nikhar × K. Jyoti	8.33	4.33	7.53	11.33	14.80	16.83
29.	P ₇ × P ₆	Panjab Nikhar × K. Kalyani	10.67	6.33	5.50	10.11	8.50	14.56
30.	P ₈ × P ₁	Ken Swadisht × K. Divya	7.00	7.00	4.77	8.33	8.10	12.67
31.	P ₈ × P ₂	Ken Swadisht × K. Shreya	10.00	7.00	5.30	11.00	10.10	14.50
32.	P ₈ × P ₃	Ken Swadisht × Pusa Supriya	6.67	4.00	6.33	10.22	10.50	14.33
33.	P ₈ × P ₄	Ken Swadisht × K. Vandana	9.67	4.67	4.87	10.11	9.70	13.06
34.	P ₈ × P ₅	Ken Swadisht × K. Jyoti	7.33	4.00	5.03	9.89	8.80	12.50
35.	P ₈ × P ₆	Ken Swadisht × K. Kalyani	6.33	4.33	4.30	10.67	10.17	15.33
36.	P ₈ × P ₇	Ken Swadisht × Panjab Nikhar	6.00	3.67	7.10	9.44	9.60	14.83
		CD (0.05)	2.05	1.34	1.33	1.87	1.61	1.73
		SE(m)	0.72	0.47	0.47	0.66	0.57	0.61
		SE(d)	1.02	0.67	0.66	0.94	0.80	0.86
		CV	14.94	16.24	10.27	14.28	8.58	7.06

Table 2: Mean performance of 8 parents and 28 hybrids for DME, DFE and DFH for spring-summer and rainy season

Sl. No	Notation	Parents/F ₁	DME		DFE		DFH	
			SS	Rainy	SS	Rainy	SS	Rainy
1.	P ₁	K. Divya	47.17	42.33	53.23	48.67	60.11	53.33
2.	P ₂	K. Shreya	49.07	41.83	54.61	45.33	64.80	51.50
3.	P ₃	Pusa Supriya	50.10	45.83	57.60	51.58	62.30	57.00
4.	P ₄	K. Vandana	49.20	41.28	55.33	46.17	62.37	51.50
5.	P ₅	K. Jyoti	54.26	44.33	56.60	47.50	65.51	53.00
6.	P ₆	K. Kalyani	53.60	41.00	61.10	45.46	68.57	52.00
7.	P ₇	Panjab Nikhar	49.43	41.33	59.87	46.57	64.20	52.00
8.	P ₈	Ken Swadisht	50.07	41.50	60.20	50.93	67.27	56.17
9.	P ₂ × P ₁	K. Shreya × K. Divya	39.93	36.33	47.70	37.62	51.95	44.50
10.	P ₃ × P ₁	Pusa Supriya × K. Divya	40.80	42.33	46.00	39.02	52.24	47.00
11.	P ₃ × P ₂	Pusa Supriya × K. Shreya	51.20	42.83	50.63	43.74	55.57	49.50
12.	P ₄ × P ₁	K. Vandana × K. Divya	44.63	38.17	51.17	42.67	58.22	48.50
13.	P ₄ × P ₂	K. Vandana × K. Shreya	41.90	40.83	49.30	44.50	55.80	51.50
14.	P ₄ × P ₃	K. Vandana × Pusa Supriya	49.00	43.50	49.07	47.14	54.17	51.63
15.	P ₅ × P ₁	K. Jyoti × K. Divya	49.40	44.50	53.10	47.62	65.20	53.33
16.	P ₅ × P ₂	K. Jyoti × K. Shreya	41.47	45.67	56.33	46.00	61.63	52.00
17.	P ₅ × P ₃	K. Jyoti × Pusa Supriya	52.10	46.00	56.23	49.87	65.67	54.67
18.	P ₅ × P ₄	K. Jyoti × K. Vandana	55.20	46.33	60.70	46.53	70.17	51.00
19.	P ₆ × P ₁	K. Kalyani × K. Divya	47.70	43.00	52.23	50.56	58.72	57.13
20.	P ₆ × P ₂	K. Kalyani × K. Shreya	53.00	37.42	61.47	45.22	71.02	53.00
21.	P ₆ × P ₃	K. Kalyani × Pusa Supriya	41.70	45.83	53.20	47.26	62.13	54.50
22.	P ₆ × P ₄	K. Kalyani × K. Vandana	49.73	43.33	55.55	42.93	62.15	46.57
23.	P ₆ × P ₅	Panjab Nikhar × K. Jyoti	53.60	43.17	60.40	43.17	68.74	51.00
24.	P ₇ × P ₁	Panjab Nikhar × K. Divya	57.17	37.33	54.20	40.14	64.54	47.17
25.	P ₇ × P ₂	Panjab Nikhar × K. Shreya	55.30	42.33	60.90	43.83	63.99	48.17
26.	P ₇ × P ₃	Panjab Nikhar × Pusa Supriya	58.70	40.39	60.10	47.00	67.30	53.50
27.	P ₇ × P ₄	Panjab Nikhar × K. Vandana	60.30	41.33	58.23	39.73	68.85	45.17
28.	P ₇ × P ₅	Panjab Nikhar × K. Jyoti	53.20	45.50	59.00	51.37	68.17	57.00
29.	P ₇ × P ₆	Panjab Nikhar × K. Kalyani	40.72	34.83	50.27	39.17	63.51	45.50
30.	P ₈ × P ₁	Ken Swadisht × K. Divya	48.17	37.00	59.42	46.00	68.30	51.70
31.	P ₈ × P ₂	Ken Swadisht × K. Shreya	55.70	44.00	57.02	43.33	63.97	49.50
32.	P ₈ × P ₃	Ken Swadisht × Pusa Supriya	56.60	35.50	59.90	38.01	67.00	44.50
33.	P ₈ × P ₄	Ken Swadisht × K. Vandana	48.40	43.39	47.10	45.57	53.90	50.17
34.	P ₈ × P ₅	Ken Swadisht × K. Jyoti	43.22	44.00	55.03	39.66	63.10	47.30
35.	P ₈ × P ₆	Ken Swadisht × K. Kalyani	42.00	41.67	47.97	40.50	54.33	48.60
36.	P ₈ × P ₇	Ken Swadisht × Panjab Nikhar	44.50	42.22	57.50	41.94	64.12	49.60
		CD (0.05)	2.39	3.07	4.043	1.869	2.275	2.64
		SE(m)	0.84	1.08	1.431	0.662	0.805	0.934
		SE(d)	1.20	1.53	2.024	0.936	1.139	1.321
		CV	2.97	4.49	4.479	2.556	2.219	3.183

Table 3: Mean performance of 8 parents and 28 hybrids for inter-nodal length, fruit length and fruit girth for spring-summer and rainy season

Sl. No	Notation	Parents/F ₁	Inter-nodal Length (cm)		Fruit Length (cm)		Fruit Girth (cm)	
			SS	Rainy	SS	Rainy	SS	Rainy
1.	P ₁	K. Divya	8.13	10.03	17.19	21.35	11.42	12.62
2.	P ₂	K. Kashi Shreya	8.78	10.07	20.44	19.33	11.06	11.80
3.	P ₃	Pusa Supriya	8.76	9.97	18.76	22.01	10.66	12.36
4.	P ₄	K. Vandana	8.81	11.58	19.16	23.89	11.03	14.05
5.	P ₅	K. Jyoti	8.19	9.85	18.31	23.35	9.69	12.29
6.	P ₆	K. Kalyani	7.25	10.15	19.64	20.10	11.19	12.47
7.	P ₇	Panjab Nikhar	8.13	10.17	21.52	25.66	12.24	13.69
8.	P ₈	Ken Swadisht	8.33	11.11	19.67	23.57	11.57	13.48
9.	P ₂ × P ₁	K. Shreya × K. Divya	8.29	10.98	18.32	20.62	13.94	12.14
10.	P ₃ × P ₁	Pusa Supriya × K. Divya	8.62	9.93	19.19	23.44	12.83	12.38
11.	P ₃ × P ₂	Pusa Supriya × K. Shreya	7.89	9.92	21.01	19.56	11.18	11.45
12.	P ₄ × P ₁	Kashi Vandana × K. Divya	8.18	9.70	18.92	25.18	10.92	11.26
13.	P ₄ × P ₂	K. Vandana × K. Shreya	7.48	9.83	20.78	23.12	11.07	12.36
14.	P ₄ × P ₃	K. Vandana × Pusa Supriya	8.61	10.66	26.54	25.99	12.81	11.95
15.	P ₅ × P ₁	K. Jyoti × K. Divya	7.69	9.72	19.82	22.44	12.79	11.99
16.	P ₅ × P ₂	K. Jyoti × K. Shreya	8.02	9.72	23.43	24.51	11.06	12.26
17.	P ₅ × P ₃	K. Jyoti × Pusa Supriya	7.34	8.42	20.61	29.22	10.51	13.42
18.	P ₅ × P ₄	K. Jyoti × K. Vandana	7.60	8.78	26.07	22.22	13.76	12.36
19.	P ₆ × P ₁	K. Kalyani × K. Divya	7.62	8.23	16.55	28.34	10.74	13.55
20.	P ₆ × P ₂	K. Kalyani × K. Shreya	8.30	9.44	18.72	21.52	14.29	11.81
21.	P ₆ × P ₃	K. Kalyani × Pusa Supriya	9.22	9.39	20.16	23.84	10.42	12.17
22.	P ₆ × P ₄	K. Kalyani × K. Vandana	7.42	10.48	18.80	22.87	11.33	12.08
23.	P ₆ × P ₅	Panjab Nikhar × K. Jyoti	8.28	9.03	20.28	21.37	10.64	13.71
24.	P ₇ × P ₁	Panjab Nikhar × K. Divya	7.17	11.88	17.87	25.39	10.76	12.82
25.	P ₇ × P ₂	Panjab Nikhar × K. Shreya	6.81	10.25	24.87	34.56	10.60	14.17
26.	P ₇ × P ₃	Panjab Nikhar × Pusa Supriya	7.33	9.09	26.17	32.70	13.98	12.33
27.	P ₇ × P ₄	Panjab Nikhar × K. Vandana	7.24	11.17	19.37	20.80	10.88	11.91
28.	P ₇ × P ₅	Panjab Nikhar × K. Jyoti	7.31	8.17	25.71	31.09	13.35	15.09
29.	P ₇ × P ₆	Panjab Nikhar × K. Kalyani	7.06	10.28	22.72	28.54	10.60	14.82
30.	P ₈ × P ₁	Ken Swadisht × K. Divya	7.59	8.18	25.92	26.53	11.00	13.23
31.	P ₈ × P ₂	Ken Swadisht × K. Shreya	6.67	10.28	20.33	20.55	10.86	12.83
32.	P ₈ × P ₃	Ken Swadisht × Pusa Supriya	5.91	10.92	18.08	21.40	13.08	13.04
33.	P ₈ × P ₄	Ken Swadisht × K. Vandana	7.06	8.69	20.77	22.78	13.62	12.28
34.	P ₈ × P ₅	Ken Swadisht × K. Jyoti	7.12	10.01	27.20	21.62	14.22	15.78
35.	P ₈ × P ₆	Ken Swadisht × K. Kalyani	8.17	10.23	24.45	28.88	11.45	12.05
36.	P ₈ × P ₇	Ken Swadisht × Panjab Nikhar	7.65	9.58	20.48	25.90	10.44	11.94
		CD (0.05)	0.923	0.801	1.514	1.801	1.02	0.909
		SE(m)	0.327	0.283	0.536	0.638	0.361	0.322
		SE(d)	0.462	0.401	0.758	0.902	0.511	0.455
		CV	7.266	4.961	4.423	4.555	5.338	4.359

Table 4: Mean performance of 8 parents and 28 hybrids for fruit weight, yield per plant and yield per hectare for spring-summer and rainy season

Sl. No	Notation	Parents/F ₁	Fruit Weight (g)		Yield/plant (kg)		Yield/ha (q/ha)	
			SS	Rainy	SS	Rainy	SS	Rainy
1.	P ₁	K. Divya	111.98	123.70	114.34	117.87	1.30	2.36
2.	P ₂	K. Shreya	110.77	128.08	110.48	118.78	1.26	2.38
3.	P ₃	Pusa Supriya	119.08	146.82	165.64	172.48	1.88	3.45
4.	P ₄	K. Vandana	112.00	144.20	130.36	164.47	1.48	3.29
5.	P ₅	K. Jyoti	108.33	130.33	135.51	144.04	1.54	2.88
6.	P ₆	K. Kalyani	102.67	129.03	110.52	112.53	1.26	2.25
7.	P ₇	Panjab Nikhar	124.70	153.19	124.23	176.45	1.41	3.53
8.	P ₈	Ken Swadisht	117.63	146.96	151.05	163.95	1.72	3.28
9.	P ₂ × P ₁	K. Shreya × K. Divya	95.48	128.92	144.01	153.22	1.64	3.06
10.	P ₃ × P ₁	Pusa Supriya × K. Divya	125.61	142.17	133.53	132.44	1.52	2.65
11.	P ₃ × P ₂	Pusa Supriya × K. Shreya	92.33	119.06	85.07	133.37	0.97	2.67
12.	P ₄ × P ₁	K. Vandana × K. Divya	121.59	163.91	137.66	198.76	1.56	3.98
13.	P ₄ × P ₂	K. Vandana × K. Shreya	94.83	137.92	82.68	180.77	0.94	3.62
14.	P ₄ × P ₃	K. Vandana × Pusa Supriya	131.25	157.96	146.84	157.03	1.67	3.14
15.	P ₅ × P ₁	K. Jyoti × K. Divya	100.33	125.26	82.92	101.69	0.94	2.03
16.	P ₅ × P ₂	K. Jyoti × K. Shreya	96.89	124.31	89.29	112.37	1.01	2.25
17.	P ₅ × P ₃	K. Jyoti × Pusa Supriya	125.10	171.04	186.46	244.64	2.12	4.89
18.	P ₅ × P ₄	K. Jyoti × K. Vandana	128.67	152.12	134.87	167.79	1.53	3.36
19.	P ₆ × P ₁	K. Kalyani × K. Divya	129.22	139.29	128.39	119.81	1.46	2.40
20.	P ₆ × P ₂	K. Kalyani × K. Shreya	105.72	143.04	97.14	146.98	1.10	2.94
21.	P ₆ × P ₃	K. Kalyani × Pusa Supriya	114.66	125.80	98.92	166.64	1.12	3.33
22.	P ₆ × P ₄	K. Kalyani × K. Vandana	115.37	134.03	175.81	139.99	2.00	2.80
23.	P ₆ × P ₅	Panjab Nikhar × K. Jyoti	123.40	162.19	174.16	181.63	1.98	3.63
24.	P ₇ × P ₁	Panjab Nikhar × K. Divya	121.03	134.38	107.25	117.45	1.22	2.35
25.	P ₇ × P ₂	Panjab Nikhar × K. Shreya	133.44	172.48	181.37	212.54	2.06	4.25
26.	P ₇ × P ₃	Panjab Nikhar × Pusa Supriya	135.26	181.10	185.05	207.21	2.10	4.14
27.	P ₇ × P ₄	Panjab Nikhar × K. Vandana	131.31	162.14	116.43	189.94	1.32	3.80
28.	P ₇ × P ₅	Panjab Nikhar × K. Jyoti	134.01	169.42	132.54	189.33	1.51	3.79
29.	P ₇ × P ₆	Panjab Nikhar × K. Kalyani	122.25	152.51	185.85	166.33	2.11	3.33
30.	P ₈ × P ₁	Ken Swadisht × K. Divya	95.28	122.20	85.59	100.28	0.97	2.01
31.	P ₈ × P ₂	Ken Swadisht × K. Shreya	97.35	127.62	89.71	112.42	1.02	2.25
32.	P ₈ × P ₃	Ken Swadisht × Pusa Supriya	119.75	154.24	152.08	202.96	1.73	4.06
33.	P ₈ × P ₄	Ken Swadisht × K. Vandana	114.19	137.20	118.56	143.80	1.35	2.88
34.	P ₈ × P ₅	Ken Swadisht × K. Jyoti	125.29	160.05	198.55	228.19	2.26	4.56
35.	P ₈ × P ₆	Ken Swadisht × K. Kalyani	122.09	176.31	195.78	241.29	2.22	4.83
36.	P ₈ × P ₇	Ken Swadisht × Panjab Nikhar	118.81	134.59	102.73	123.96	1.17	2.48
		CD (0.05)	12.13	9.84	24.50	18.67	0.28	0.37
		SE(m)	4.30	3.48	8.67	6.61	0.09	0.13
		SE(d)	6.07	4.93	12.27	9.35	0.14	0.18
		CV	6.41	4.17	11.18	7.15	11.19	7.14

Note: K.-Kashi, SS-spring-summer season, DG-days to 50% germination, NFME-node number to 1st male flower emergence, NFFE-node number to 1st female flower emergence, DME-days to 1st male flower emergence, DFE-days to 1st female flower emergence, DFH-days to 1st fruit harvest

Future Scope

The identified hybrids of this study, for earliness and total yield per hectare could be exploited on commercial scale for early and higher yield of sponge gourd per unit area.

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