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## Evaluation of different hybrids for growth, yield and fruit quality in sponge gourd (*Luffa cylindrical M. Roem*)

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### Abstract

The present investigation entitled “Evaluation of different hybrids for growth, yield and fruit quality in Sponge Gourd (*Luffa cylindrical M. Roem*)” was carried out at Vegetable Research Farm, Department of Horticulture, SHUATS, Prayagraj (U.P.) during zaid season of 2020-2021 of 24 hybrids, with 3 replications in Randomized Block Design (RBD). Analysis of variance in the present investigation indicated that the hybrids evaluated differed significantly among all the treatment for all the character traits. The study revealed that the hybrid 2019/SPGHYB-4 recorded the minimum in days to first female flower appearance (36.67 days), minimum in male flower appearance on node (7.33), maximum in vine length (6.60 cm), fruit length (27 cm), fruit diameter (3.90 cm), no. of fruits per plant (12.21), fruit yield per plant (1.55 kg/plant) and maximum yield (137.17 q/ha). The hybrid 2018/SPGHYB-5 recorded the minimum in days to first male flower appearance (40.16 days), the maximum fruit weight (138.30 kg) and TSS (4.81° Brix). The minimum days to first harvest was observed in hybrid 2020/SPGHYB-5 (43.20 days) while the minimum days to last harvest was recorded in hybrid 2020/SPGHYB-7 (94.49 days). The hybrid 2019/SPGHYB-4 was found to be the superior hybrid in terms of growth, yield and fruit quality.

**Keywords:** Growth, quality, yield and hybrids

### Introduction

Sponge gourd [*Luffa cylindrica M. Roem.*] is an important vegetable crop having chromosomes ( $2n=26$ ). It is an annual climbing plant and cross pollinated in nature. It is a member of the cucurbitaceous family. The main commercial production countries are China, Korea, India, Japan and Central America. In India the crop is widely grown in Uttar Pradesh, Bihar, West Bengal, Orissa, Assam, Andhra Pradesh and Kerala (Arya and Prakash, 2002). Sponge gourds are popularly cultivated for harvesting both of mature-green fruit and dry fruit because of its high nutrient value (Bor, 2006; Partap, 2012) and tough fibrous vascular system (Klemm, 2001; Mazali and Alves, 2005; Hassan, 2006). The vines of sponge gourd attain the height of 30 feet or more. The fruits of sponge gourd are cylindrical in shape and outer skin is smooth green. The fruit contains white inner flesh which is fibrous and have similar flavor to bitter melon. The fruit attains the height of 1-2 feet. Fully ripened sponge gourd contains high fiber content which is used as cleansing agent and for making table mats, shoe-soles etc. The sponge gourd is also regarded as an important medicinal plant that needs to be conserved (Sutharshana, 2013). In the past, most of the research relating to commercial luffa production has been conducted in the tropical and subtropical climates of India. Sponge gourd can be grown from tropical to subtropical climatic conditions and they thrive best in warm and humid conditions. It also grows best during the rainy season. Only a few studies have been conducted in temperate climates. Therefore the existence of wide genetic variation in sponge gourd in hot arid areas provides ample scope for screening the best hybrids for specific traits. Hence, the present study was undertaken to evaluate the different hybrids for their growth, yield and fruit quality.

### Materials and Methods

This chapter contains the details of materials and methodology which was used during the experiment. The present investigation entitled “Evaluation of different hybrids for growth, yield and fruit quality in Sponge Gourd (*Luffa cylindrica M. Roem.*)” was carried out at the field of the Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the year 2020-2021. Prayagraj is situated at an elevation of 98

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meters above sea level at 25°87' North latitude and 81°15' East longitude. This region has a sub-tropical climate prevailing in the South-East part of Uttar Pradesh with both the extremes in temperature, i.e. the winter and the summer. In cold winters, the temperature sometimes drops as low as 4 °C- 5 °C in December – January and the temperature reaches upto 46 °C- 48°C during hot summers in the months of

May and June. The average rainfall is around 1013.4 mm with maximum concentration during the months of July to September with occasional showers in winters. The present experiment was conducted in Randomized Block Design with 24 hybrids which were replicated 3 times. Listed under Table 1, the sowing of experimental material was done on February 2, 2021.

**Table 1:** List of Hybrids

Sl.No	Hybrid Symbol	Name of Hybrids	Source
1	H1	2019/SPGHYB-1	IIVR VARANASI
2	H2	2019/SPGHYB-2	IIVR VARANASI
3	H3	2019/SPGHYB-3	IIVR VARANASI
4	H4	2019/SPGHYB-4	IIVR VARANASI
5	H5	2019/SPGHYB-5	IIVR VARANASI
6	H6	2019/SPGHYB-6	IIVR VARANASI
7	H7	2018/SPGHYB-1	IIVR VARANASI
8	H8	2018/SPGHYB-2	IIVR VARANASI
9	H9	2018/SPGHYB-3	IIVR VARANASI
10	H10	2018/SPGHYB-4	IIVR VARANASI
11	H11	2018/SPGHYB-5	IIVR VARANASI
12	H12	2018/SPGHYB-7	IIVR VARANASI
13	H13	2018/SPGHYB-8	IIVR VARANASI
14	H14	2020/SPGHYB-1	IIVR VARANASI
15	H15	2020/SPGHYB-2	IIVR VARANASI
16	H16	2020/SPGHYB-3	IIVR VARANASI
17	H17	2020/SPGHYB-4	IIVR VARANASI
18	H18	2020/SPGHYB-5	IIVR VARANASI
19	H19	2020/SPGHYB-6	IIVR VARANASI
20	H20	2020/SPGHYB-7	IIVR VARANASI
21	H21	HY SPONGE GOURD BURNE 102	ALOPIBAGH
22	H22	SPONGE GOURD F1 TINA	ALOPIBAGH
23	H23	HYB SPONGE GOURD FI ATIKA	ALOPIBAGH
24	H24	F1 SPONGE GOURD LHS-0503	ALOPIBAGH

## Results and Discussion

The mean characteristics for the growth, yield and fruit quality of different hybrids of sponge gourd have been presented in Table 2. It is evident from the table that there were significant differences among the various hybrids of sponge gourd. The maximum length of main vine was recorded in the hybrid H<sub>4</sub> (2019/SPGHYB- 4) with 6.60 cm followed by hybrid H<sub>5</sub> (2019/SPGHYB-5) with 6.53cm. The minimum days to first male flower appearance was recorded in the hybrid H<sub>11</sub> (2018/SPGHYB -5) with 40.16 days followed by hybrid H<sub>18</sub> (2020/SPGHYB-5) with 40.49 days. The minimum days to first female flower appearance was observed in the hybrid H<sub>4</sub> (2019/SPGHYB -4) with 36.67 days followed by hybrid H<sub>19</sub> (2020/SPGHYB-6) with 44.33 days. The minimum days to first harvest in the hybrid H<sub>18</sub> (2020/SPGHYB -5) with 43.20 days followed by hybrid H<sub>4</sub> (2019/SPGHYB-4) with 47.27 days while the minimum days for last harvest was recorded in the hybrid H<sub>20</sub> (2020/SPGHYB -7) with 94.49 days followed by hybrid H<sub>3</sub> (2019/SPGHYB-3) with 95.79 days. The maximum fruit length was recorded in the hybrid H<sub>4</sub> (2019/SPGHYB-4) with 27 cm followed by hybrid H<sub>16</sub> (2020/SPGHYB-3) with 26.8 cm. The maximum values associated may be due to local conditions, genetic characters and higher nutrient utilization efficiency similar to findings by Agarwal 2013 <sup>[1]</sup>; *et al.*, Ahmed 2014 <sup>[10]</sup>; *et al.* and Anand 2016 <sup>[4]</sup>; *et al.* The

maximum fruit weight was recorded in the hybrid H<sub>11</sub> (2018/SPGHYB- 5) with 138.30g followed by hybrid H<sub>23</sub> (HYB SPONGE GOURD F1 ATIKA) with 136.33g. The maximum value associated may be due to local conditions, genetic characters and higher nutrient utilization efficiency similarly reported by Bhardawaj 2014 <sup>[8]</sup>; *et al.*, Das 2015 <sup>[13]</sup>; *et al.* The maximum fruit diameter was recorded in the hybrid H<sub>4</sub> (2018/SPGHYB- 4) with 3.90 cm followed by hybrid H<sub>11</sub> (2018/SPGHYB-5) with 3.76 cm. The maximum value associated may be due to local conditions, genetic characters and higher nutrient utilization efficiency as reported by Choudhary 2014 <sup>[12]</sup>; *et al.*, Bindiya 2006; <sup>[11]</sup> *et al.* The maximum number of fruits per plant was recorded in the hybrid H<sub>4</sub> (2019/SPGHYB- 4) with 12.21 followed by hybrid H<sub>7</sub> (2018/SPGHYB-1) with 11.75. The maximum number of fruit yield per plant was recorded in the hybrid H<sub>4</sub> (2019/SPGHYB- 4) with 1.55 Kg/plant followed by hybrid H<sub>11</sub> (2018/SPGHYB-5) with 1.51 Kg/plant. The maximum yield was recorded in the hybrid H<sub>4</sub> (2019/SPGHYB- 4) with 137.17 q/ha followed by hybrid H<sub>11</sub> (2018/SPGHYB-5) with 133.63 q/ha. The maximum value associated with may be due to local conditions, genetic characters and higher nutrient utilization efficiency as reported by Ajmal 2018 <sup>[3]</sup>; *et al.*, Anjanappa 2012 <sup>[5]</sup>; *et al.*, Bashan 2010 <sup>[6]</sup>; *et al.*, Beneduzi 2012 <sup>[7]</sup>; *et al.*

**Table 2:** Evaluation of different hybrids for the growth, yield and fruit quality of Sponge Gourd

Hybrid Name	Vine Length (cm)	1 <sup>st</sup> Male Flower (days)	1 <sup>st</sup> Female Flower (days)	1 <sup>st</sup> Harvest (days)	Last Harvest (days)	Fruit Length (cm)	Fruit Weight (g)	Fruit Diameter (cm)	1 <sup>st</sup> Male Flower on Node	1 <sup>st</sup> Female Flower on Node	No. of Fruits/plant	Fruit yield/plant (kg/plant)	Yield (q/ha)	TSS (°Brix)
2019/SPGHYB-1	6.50	42.17	52.00	52.67	109.06	26.67	130.10	2.67	4.00	8.67	10.27	1.33	117.69	4.73
2019/SPGHYB-2	4.77	43.22	53.67	55.50	98.42	23.67	123.67	3.03	4.67	8.33	10.11	1.25	110.61	4.64
2019/SPGHYB-3	4.93	41.61	53.00	54.80	95.79	22.67	124.00	2.87	4.13	8.33	10.82	1.34	118.58	4.13
2019/SPGHYB-4	6.60	42.06	36.67	47.27	96.76	27.00	127.32	3.90	3.67	7.33	12.21	1.55	137.17	4.60
2019/SPGHYB-5	6.53	47.72	55.00	47.47	106.86	24.67	124.33	3.00	4.33	7.67	10.71	1.33	117.70	4.71
2019/SPGHYB-6	4.90	44.33	49.67	57.33	109.73	25.33	124.33	2.70	4.67	8.67	10.78	1.34	118.58	4.53
2018/SPGHYB-1	4.90	43.38	51.67	52.40	108.41	26.67	127.55	2.67	4.00	7.67	11.75	1.49	131.86	4.28
2018/SPGHYB-2	5.47	43.94	52.33	57.53	104.77	26.00	134.60	2.87	4.55	7.67	10.76	1.44	127.43	4.60
2018/SPGHYB-3	5.63	42.55	53.67	47.70	107.77	23.33	131.13	3.20	5.33	8.33	11.16	1.46	129.20	4.39
2018/SPGHYB-4	5.20	43.82	49.00	59.17	97.63	23.00	127.30	2.47	5.00	8.67	9.51	1.21	107.08	4.47
2018/SPGHYB-5	5.53	40.16	46.67	57.17	103.54	21.17	138.30	3.76	5.00	8.33	10.93	1.51	133.63	4.81
2018/SPGHYB-7	4.17	45.22	51.00	52.33	119.38	24.67	123.43	2.80	4.00	8.33	10.69	1.31	115.93	4.67
2018/SPGHYB-8	4.70	43.72	56.33	52.67	99.99	23.01	118.62	2.23	4.67	8.00	10.56	1.25	110.62	4.70
2020/SPGHYB-1	5.67	49.11	48.33	55.40	99.67	24.67	133.77	3.23	4.48	9.00	10.38	1.39	123.00	4.77
2020/SPGHYB-2	5.80	43.89	52.33	50.13	98.49	22.33	122.61	2.59	4.33	8.33	9.81	1.20	106.20	4.43
2020/SPGHYB-3	5.00	45.78	52.00	50.43	108.81	26.80	129.38	3.10	5.00	8.00	11.04	1.43	126.55	4.40
2020/SPGHYB-4	5.63	46.20	46.33	55.30	105.65	24.00	131.00	2.90	3.78	7.67	10.39	1.36	120.35	4.30
2020/SPGHYB-5	4.87	40.49	48.33	43.20	118.19	23.10	124.67	2.10	4.67	8.33	10.39	1.30	115.04	4.60
2020/SPGHYB-6	5.30	43.80	44.33	55.00	107.98	21.97	120.28	2.80	4.67	7.67	10.08	1.21	107.08	4.57
2020/SPGHYB-7	5.63	43.94	44.67	56.47	94.49	24.33	127.53	2.73	4.00	8.33	10.44	1.33	117.70	4.03
HY sponge gourd Burnie 102	4.87	43.28	49.67	49.17	96.00	24.74	128.83	2.73	4.33	8.00	9.36	1.21	107.08	4.53
Sponge gourd fl Tina	4.63	48.04	48.44	49.68	98.23	26.67	126.23	3.20	5.00	8.67	11.65	1.47	130.09	4.33
HYB sponge gourd fl Atika	5.17	42.51	56.00	59.07	104.17	22.17	136.33	3.00	4.33	8.33	10.79	1.47	130.09	4.75
Fl sponge gourd lhs- 0503	4.83	45.31	51.33	49.33	99.67	22.82	128.90	3.23	4.67	8.00	11.40	1.46	117.69	4.60
Mean	5.30	44.00	50.10	52.79	103.73	24.22	127.68	2.91	4.46	8.18	10.69	1.36	110.61	4.52
C.V	19.59	8.36	15.91	13.51	5.99	11.96	4.67	24.45	16.21	9.26	10.15	37.06	118.58	6.83
F-ratio	1.08	1.09	1.18	1.05	3.52	1.07	2.03	0.98	1.06	1.05	1.16	0.13	137.17	1.30
S.Ed (±)	0.59	2.12	4.60	4.11	3.59	1.67	3.44	0.41	0.41	0.43	0.63	0.29	117.70	0.18

## Conclusion

The results from the present investigation concluded that the Sponge Gourd hybrid of H<sub>4</sub> (2019/SPGHYB-4) was identified as the superior hybrid in terms of growth, yield and fruit quality. Analysis of variance was significant for all the characters under the study "Evaluation of different hybrids for growth, yield and fruit quality in Sponge Gourd".

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