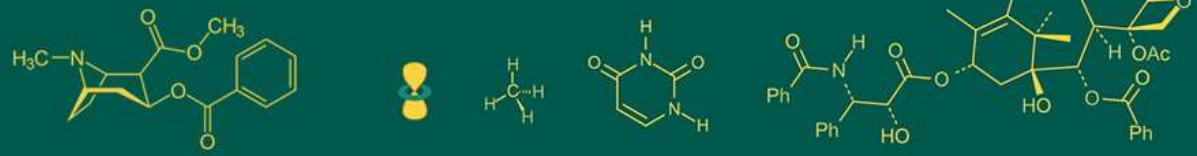
International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; 8(7): 861-864
www.biochemjournal.com
Received: 01-04-2024
Accepted: 06-05-2024

Prathavi Raj Meena
P.G. Scholar, College of Horticulture and Forestry, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Anil Kumar
Assistant Professor, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Pooja Meena
P.G Scholar, College of Agriculture, Jodhpur, Agriculture University, Jodhpur, Rajasthan, India

Vipin
Ph.D. Scholar, Department of vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Virendra Kumar
Ph.D. Scholar, Department of vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Agnivesh Yadav
Ph.D. Scholar, Department of vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Corresponding Author:
Anil Kumar
Assistant Professor, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

Mean performance of yield and its attributing characters in germplasm of sponge gourd (*Luffa cylindrica* L.)

Prathavi Raj Meena, Anil Kumar, Pooja Meena, Vipin, Virendra Kumar and Agnivesh Yadav

DOI: https://doi.org/10.33545/26174693.2024.v8.i7k.1613

Abstract
The present study was conducted at the College of Horticulture and Forestry, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya during the summer season of 2022-23. Plant material consisted of 22 genotypes of sponge gourd including 1 check namely Pusa Chikni in simple lattice design of 3x0.5 m^2 with three replications. Evaluation was done for different yield and quality traits. Among the test entries, range for fruit yield per plant varied from 0.65 to 0.96 and it was highest in the genotype NDSG-23-8 (0.96) followed by NVSG-2 (0.96), Pusa Chikni (0.93) and NDSG-23-1 (0.89) and lowest in the genotype NVSG-16 (0.65) kg/plant, number of fruits per plant, fruit length, fruit weight, respectively.

Keywords: Sponge gourd, *Luffa cylindrica*, fruit yield per plant, earliness

Introduction
Sponge gourd (*Luffa cylindrica* L.) is an important emerging high-potential vegetable crop having chromosome number (2n=2x=26), Loofah (genus Luffa), also spelled luffa, also called vegetable sponge, sponge gourd or rag gourd, genus of seven species of annual climbing vine of the gourd family (Cucurbitaceae), native to the old-world tropics. The sponge gourd cultivation history states that they have been originated in tropical countries of Africa and Asia particularly in India. It is a part of the Cucurbitaceae family, that includes 825 species and 118 genera. (Kallo, 1993) [8].

It is popular as spring summer and rainy season crops. Luffa has nine species out of which *Luffa acutangula* (L.) Roxb., *L. cylindrica* M. Roem., *L. echinta* Roxb., L. *graveolens*., *L. tuberose* Roxb. *Luffa acutangula* (ridge gourd) and *Luffa cylindrica* L. (sponge gourd) are grown throughout India in tropical region. It can be used for lung problems, nephritis, dropsy, and chronic bronchitis due to its purgative properties. It is also used externally to the body for jaundice and smelling fevers. Seed oil is applied to skin conditions which includes leprosy. (Partap *et al*., 2012) [12].

In India, sponge gourd is grown both as a single crop in cultivable areas and as part of a mixed crop along river banks. Sponge gourd is commercially grown in Malaysia, Korea, Japan, India and Central America. Sponge gourd is widely grown for medicinal purposes in Thailand, the Philippines, Indonesia, Taiwan and China. The top two countries importing sponge gourd are Brazil and the United States. Japan is the top exporter however, the crop is primarily grown in the Indian states of Uttar Pradesh, West Bengal, Bihar, Orissa, Assam, and Kerala. (Arya and Prakash *et al*., 2002) [4].

The sponge gourd is frequently cultivated for both its immature, delicate fruits and for the sponge that is used for scrubbing. When eaten, the sponge gourd's fruits stimulate the appetite and are easily digested. The nutritious vegetable sponge gourd fruits per 100 g edible portion is 93.2 g moisture, energy 18 K-cal, protein 1.2 g, fat 0.2 g, 2.9 g carbohydrates, fiber 2.0 g some nutrient compound Ca 36 mg, P 19 mg, Fe 1.1 mg, carotene 120 µg, thiamine 0.02 mg, riboflavin 0.06 mg, niacin 0.4 mg. Similarly, the composition of the young leaves, tender fruits are rich in vitamin A, vitamin C and iron (Yawalker, 2004) [18].

Materials and Methods

The experiment was conducted in Randomized Block Design with three replications to assess the performance of 22 genotypes. Each entry was sown in three rows with 3 m, net row length spaced 3.0 m. a part where, 0.5 m. with plant to plant spacing was maintained. The experiment was sown on 2nd April 2023. All the recommended agronomic package of practices and plant protection measure were followed to raise a good crop.

The data were collected on the days to anthesis of first staminate flower, days to anthesis of first pistillate flower, node number to anthesis of first staminate flower, node number to anthesis of first pistillate flower, internodal length (cm), days to first fruit harvest, vine length (cm), number of primary branches, fruit length (cm), fruit circumference (cm), average fruit weight (gm), number of fruits per plant, fruit yield per plant (kg), Total Soluble Solids (°Brix), dry matter content (%). The data were analysed by windostat 9.2 data analysis software.

Results and Discussion

Days to first staminate flower anthesis ranged from 30.33 days (NDSG-23-8) to 44.66 days (NVSG-10) with a mean value of 40.89. The genotype NDSG-23-8 (30.33) was earliest among all, followed by NVSG-2 (32.66), similar result was also reported by Abhijeet *et al*., (2018) [1] for days to first staminate flower anthesis, which is ranged from 34.00 (NDSG-10) to 60.33 (NDSG-53).

The days to first pistillate flower anthesis varied from 33.33 days (NDSG-23-8) to 47.33 days (NVSG-10). Significantly earliest days for anthesis of first pistillate flower was recorded in genotype NDSG-23-8 (33.33) followed by NVSG-2 (35.66). similar result was also reported by Sarma *et al*., (2023) for days to first pistillate flower anthesis which is varied from 40.00 (SGG29) to 73.00 (SGG5).

The genotype NDSG-23-8 node no. for first staminate flower appearance was lowest (3.53) followed by NVSG-2 (3.80). The results are conformity with the finding of Madhavi *et al*., (2023) [10] for node no. to first staminate flower appearance in ridge gourd genotypes, which is ranged from 4.35 (IC 398599) to 7.80 (Arka Sujat).

Node number to first pistillate flower appearance revealed significant variations among the population, which varied from (5.03) NDSG-23-8 to (7.1) NDSG-22. Significantly lowest node number for appearance of pistillate flower was observed in NDSG-23-8 (5.03) and was statistically at par with NVSG-2(5.06), Similar result was also reported by Mohiddin *et al*., (2022) [11] for node number for appearance of female flower, which is varying 8.73 in (AVT II 2018 SPGVAR 2) and 11.73 in (IET 2020 SPGVAR 4).

Vine length (m) at the time of final harvest ranged from 3.59 (NDSG-2) to 4.83 (NDSG- 23-8) with a mean value of 4.03 m. Longest vine length was observed NDSG-23-8 (4.83 m) and it was closely followed by NVSG-2 (4.73 m), Similar result was also observed by Som *et al*., (2018) [16] for Vine length, which is varied from 4.16 (Swarna Prabha) to 10.55 (PSG-1).

The primary branches per plant ranged from 2.86 (NDSG-23-6) to 5.03 (NDSG-23-8) with a mean value of 3.63. Maximum primary branches per plant was recorded in genotype NDSG 23-8 (5.03) which is followed by NVSG-2 (4.93). Similar result was also recorded by Dubey *et al*., (2022) [6] for primary branches per plant, in bottle gourd which is varied from 3.17(NDBG-65) to 4.63(NDBG-61).

Significant difference for internodal length (cm) was noticed ranging from 9.50 cm (NDSG-23-8) to 15.25 cm (NDSG-3) with a mean value of 13.61(cm). Among the experimented population, highest value of internodal length was noticed for NDSG-3 (15.25) followed by, NDSG-2(15.02), NVSG-31(14.60) and NVSG-14 (14.69) where statistical parity was observed. Similar result was also observed by Annigeri *et al*., 2023) [3], for internodal length, which is varied from 14.30(Kashi Shreya) to 22.03(HUB-14).

The first fruit harvest varied from 42.00 days (NDSG-23-8) to 55.00 days (NVSG-30) with a mean value of 51.89 days. Out of 22 genotypes only two genotypes *viz*., NDSG-23-8 (42.00) followed by NVSG-2 (44.66), were found significant over the best check Pusa Chikni (47.00). Similar result was also observed by Bhardwaj *et al*., (2021) [5] for first fruit harvest, which is ranged from 40.67 (EC-381651) to 56.33 (NSG-28).

The range of fruit length (cm) showed significant variations, varied from 21.18 cm (NVSG 14) to 27.54 (NDSG-23-8) with an average fruit length of 24.43 cm. Highest fruit length was noticed in NDSG-23-8 (27.54) followed by NVSG-2 (27.06). The results are conformity with the finding of Akhila *et al*., (2023) [2] for fruit length which is varied from 15.67 (AVT2020/SPGVAR-7) to 28.56 (AVT2020/SPGVAR-6).

Significant variations were recorded for fruit circumference (cm) which varied from 13.03 cm (NDSG-2) to 15.40 cm (NDSG-23-8) with a mean value of 14.17 cm. Significantly highest fruit circumference was observed in the genotype NDSG-23-8 (15.40), which is statistically at par with NVSG-2 (15.33), Similar result was also observed by Singh *et al*., (2017) [15], for fruit circumference which is varied from 7.87 (NDSG-1) to 13.83 (NDSG-4).

Results of average fruit weight revealed significant variations among the population which ranged from (115gm) NDSG-3 to (140.33gm) NDSG-23-8 with an average fruit weight of 126.50. Out of 22 genotypes only two genotypes *viz*., NDSG-23-8 (140.33) followed by NVSG-2 (138.66), were found significant over the best check Pusa Chikni (137.00). Similar result was also reported by Pongen *et al*., (2021) [14], for average fruit weight, which is ranged from 118.62 (2018/SPGHYB-8) to 138.30 (2018/SPGHYB-5).

The variations in number of fruits plant-^{1} ranged from 5.43 (NVSG-16) to 7.03 (NDSG- 23-8) with an average value of 6.13. Highest number of fruits plant-^{1} was noticed in NDSG- 23-8 (7.03) closely followed by NVSG-2 (6.93). Similar result was also observed by Patton *et al*., (2024) [13], for number of fruits plant which is varying from 3.67 (NUSG-21-27) to 6.33 (NUSG 21-11).

The range of total soluble solids (°Brix) varied from 3.86 (NVSG-10) to 4.50 (NDSG- 23-8) with a mean value of 4.09. Significantly highest TSS (°Brix) of 4.50 was observed in NDSG 23-8 (4.50) followed by NVSG-2 (4.40). The results are conformity with the finding of Gold *et al*., (2023) [7] for total soluble solid, IET 2021/SPGVAR-4 (3.03) to AVT-II 2019/SPGVAR-2 (7.5).

Significant difference for Dry matter (%) was noticed ranging from (9.40) NDSG-23-8 to (12.03) NDSG-23-3 with a mean value of 10.67. Maximum amount of dry matter was obtained from genotype NDSG-23-2 (12.03), Followed by NDSG-3 (11.86), and NDSG-23-6 (11.60). Similar result was also observed by Yadav *et al*., (2020) [17], for dry

matter, which is ranged from 7.83% (Pant Tori-1) to 6.89% (KSG-9).

The results showed that significant difference was observed between the genotypes for fruit yield plant-[1], which ranged from (0.64 to 0.96) with a mean value of 0.77. Out of 22 genotypes only two genotypes *viz*., NDSG-23-8 (0.98) followed by NVSG-2 (0.96), were found significant over the best check Pusa Chikni (0.93). Similar result was also observed by Kurre *et al*., (2022) [9], for fruit yield plant which is ranged from 1.38 (RIGVAR-3) to 1.68 (RIGVAR 5).

Table 1: Mean performance of 22 genotypes for fifteen characters in sponge gourd

	Days to first staminate flower Anthesis	Days to first pistillate flower anthesis	Node number to first staminate flower appearance	Node number to first pistillate flower appearance	Vine length (m)	Primary branches per plant	Internodal length (cm)	Days to first fruit harvest	Fruit length (cm)	Fruit circumference (cm)	Average fruit weight (gm)	Number of fruits per plant	T.S.S (°Brix)	Dry matter (%)	Fruit yield per plant (kg)
NVSG-2	32.67	35.67	3.80	5.07	4.73	4.93	9.80	44.67	27.07	15.33	138.67	6.93	4.40	9.53	0.96
NDSG-22	42.33	46.33	5.00	7.10	3.88	2.90	14.03	53.67	23.17	13.78	123.67	5.77	3.97	11.40	0.71
NVSG-31	41.67	46.67	4.97	6.53	4.05	3.53	14.60	55.00	24.30	13.59	121.33	5.80	4.00	10.50	0.70
NVSG-30	43.33	46.67	4.73	6.00	3.90	3.27	14.24	55.00	25.33	13.96	126.53	5.57	4.30	11.43	0.71
NVSG-16	42.33	45.33	5.00	6.77	4.09	3.07	14.33	54.33	24.05	13.40	118.00	5.43	3.93	11.13	0.65
NVSG-14	43.00	46.33	5.27	6.47	3.92	2.93	14.70	52.67	21.18	13.52	120.00	5.93	3.90	10.80	0.72
NVSG-12	41.00	44.33	4.77	7.00	3.65	3.03	14.09	50.33	21.86	14.43	117.00	6.10	4.13	10.43	0.71
NVSG-10	44.67	47.33	4.90	7.07	3.81	3.07	13.67	53.67	23.18	14.35	123.67	5.73	3.87	10.53	0.71
NDSG-23-7	41.67	45.33	4.87	6.53	4.09	3.20	14.42	53.67	23.87	14.89	122.33	6.23	4.03	10.57	0.77
NDSG-23-2	41.67	45.33	4.73	6.40	3.93	3.13	14.65	53.00	24.70	13.67	121.00	5.63	4.07	12.03	0.68
NDSG-23-8	30.33	33.33	3.53	5.03	4.83	5.03	9.50	42.00	27.54	15.40	140.33	7.03	4.50	9.40	0.98
NDSG-3	43.67	47.00	4.53	7.03	3.96	3.30	15.25	54.67	25.02	14.50	115.00	6.43	4.00	11.87	0.74
NDSG-23-1	35.00	37.53	4.10	5.20	4.37	4.60	11.13	46.33	26.40	15.17	135.00	6.60	4.17	9.93	0.89
NDSG-23-3	43.67	47.33	4.47	6.07	3.93	2.83	14.47	54.67	24.02	14.14	122.67	6.07	4.07	11.40	0.74
NDSG-23-6	43.33	46.33	4.87	6.60	3.98	2.87	14.53	54.20	22.40	13.80	127.47	5.90	4.07	11.60	0.75
NDSG-23-4	42.00	45.00	5.23	6.83	3.89	3.47	13.93	54.07	24.56	14.06	122.67	6.30	4.20	10.50	0.77
NDSG-40	43.67	46.33	5.47	7.10	3.90	3.67	14.23	53.67	25.73	13.40	127.67	6.17	3.90	10.17	0.79
NVSG-29	44.33	47.33	5.50	6.80	3.90	3.93	14.67	52.67	24.18	15.00	132.67	6.33	4.07	10.03	0.84
NDSG--2	42.00	45.00	5.23	7.10	3.60	4.17	15.03	50.00	24.18	13.03	130.67	6.07	4.00	10.57	0.79
NVSG-11	42.00	46.00	5.17	6.53	3.96	4.17	14.32	54.00	24.35	13.76	129.33	6.03	4.13	10.60	0.78
NVSG-9	40.67	45.67	4.83	6.40	3.99	4.27	13.03	52.33	23.77	13.47	130.33	6.00	4.07	10.60	0.78
PUSA CHIKNI	34.67	38.00	3.90	5.47	4.50	4.63	10.93	47.00	26.67	15.26	137.00	6.80	4.30	9.80	0.93
Mean	40.89	44.28	4.77	6.41	4.04	3.64	13.62	51.89	24.43	14.18	126.50	6.13	4.09	10.67	0.78
C.V.	5.82	5.35	10.58	9.06	7.09	7.73	7.00	6.31	6.07	5.80	5.44	6.73	3.47	4.38	8.06
S.E.	1.37	1.37	0.29	0.34	0.17	0.16	0.55	1.89	0.86	0.47	3.97	0.24	0.08	0.27	0.04
C.D. 5%	3.92	3.90	0.83	0.96	0.47	0.46	1.57	5.39	2.44	1.35	11.33	0.68	0.23	0.77	0.10
C.D. 1%	5.24	5.22	1.11	1.28	0.63	0.62	2.10	7.21	3.27	1.81	15.15	0.91	0.31	1.03	0.14

Discussion

Sponge gourd (*Luffa cylindrica* L.) is one of the important vegetable crops of Cucurbitaceae family. The present investigation was undertaken to evaluate 22 genotypes of sponge gourd for horticultural traits. The genotypes *viz*. NDSG23-8 and NVSG-2 performed better over the check (Pusa Chikni) in terms of fruit yield per plant. It can be concluded that, as a wide range of variation for almost all the economically important traits was present in this crop, so there is a vast scope for improvement through different breeding procedure.

Acknowledgement

I express my wholehearted gratitude and sincere thanks to my Major Advisor Dr. Anil Kumar, Department of Vegetable Science, College of Horticulture and Forestry, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, for suggesting this interesting research work and for all her scholarly guidance, keen interest, support and suggestive criticism throughout the course of this investigation and preparation of this research. Despite her multidimensional responsibilities, the most affectionately extended kind cooperation and encouragement.

References

1. Abhijeet SK, Yadav NP, Singh VB, Mishra SK. Genetic variability studies on sponge gourd [*Luffa cylindrica* (L.) Roem.]. Int J Environ Agric Biotech. 2018;11:941-945.
2. Akhila J, Topno SE, Bahadur V. Evaluation of different varieties of sponge gourd under prayagraj agro climatic conditions. Int J Environ Clim. 2023;13(10):1194-1199.
3. Annigeri SV, Shashidhar TR, Patil RV, Kulkarni S, Patil BR. Performance of sponge gourd [*Luffa cylindrica* (Roem.) L.] genotypes for growth, yield and quality traits. Pharma Innov J. 2023;12:461-468.
4. Arya PS, Prakash S. Vegetable growing in India. Kalyani Publishers; 2002:6:233.
5. Bhardwaj DR, Kumar V. Quantification of parents and diallel derived progenies contributing towards heterosis in sponge gourd [*Luffa cylindrica* (Roem) L.]. Ann Plant Soil Res. 2021;23(4):441-447.
6. Dubey A, Ram CN, Alam K, Shukla R, Pandey V. To study the genetic variability, heritability and genetic advance for agronomic traits of bottle gourd [*Lagenaria siceraria* (Mol.) Standl]. Pharm Innov J. 2022;11:1362-1366.
7. Gold RS, Topno SE, Bahadur V, Prasad VM, Kerketta A. Evaluation of different genotypes of sponge gourd

[*Luffa cylindrica* L.] under prayagraj agro climatic conditions. Int J Environ Clim. 2023;13(9):1096-1105.
8. Kallo G, Bergh. Loofah-luffa, Genetic improvement of vegetable crops. Pergamon Pres; c1993. p. 265-266.
9. Kurre C, Bahadur V, Topno SE, Kerketta A. Performance of ridge gourd (*Luffa acutangula* L.) genotypes in prayagraj agro-climatic conditions. Pharm Innov J. 2022;11:1048-1052.
10. Madhavi N, Naidu LN, Reddy RVSK, Jyothi KU, Babu DR, Krishna U. Mean performance of ridge gourd parents and hybrids for yield and quality characters. Pharm Innov J. 2023;12(6):6181-6186.
11. Mohiddin SG, Kerketta A, Bahadur V, Topno SE, Priyanka TS, Mohiddin SAK. Evaluation of different genotypes of sponge gourd (*Luffa cylindrica* M. Roem.) for growth yield and fruit quality in prayagraj agro-climatic conditions. Int J Environ Clim. 2022;12(11):66-72.
12. Partap S, Kumar A, Sharma NK, Jha KK. *Luffa cylindrica*: An important medicinal plant. J Nat Prod. 2012;2(1):127-134.
13. Patton MS, Kanaujia S, Jamir S, Kumar A. Evaluation of different genotypes of sponge gourd (*Luffa cylindrica* L.) under foothill condition of nagaland. Ann Plant Soil Res. 2024;26(1):159-163.
14. Pongen S, Kerketta A, Bahadur V. Evaluation of different hybrids for growth, yield and fruit quality in sponge gourd (*Luffa cylindrica* M. Roem). Pharm Innov J. 2021;10(11):1470-1472.
15. Singh YP, Singh VB, Singh PK, Kumar V, Pandey M, Singh G. Studies on mean performance for yield and its contributing traits of sponge gourd [*Luffa cylindrica* (Roem) L.]. Int J Curr Microbiol App Sci. 2017;6(8):1170-1179.
16. Som I. Variability and character association studies in sponge gourd (*Luffa cylindrica* L. Roem.) for yield and its attributing traits [dissertation]. Indira Gandhi Krishi Vishwavidhyalaya, Raipur; 2018.
17. Yadav V. Studies on genetic variability in sponge gourd [*Luffa cylindrica* (L.) Roem.] [dissertation]. Banda University of Agriculture & Technology, Banda Uttar Pradesh; 2020.
18. Yawalker KS. Cucurbitaceous or vine crops. In: Vegetable Crops of India. 5th ed; c2004. p. 152-155.