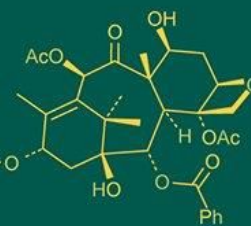
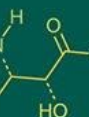
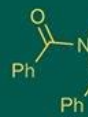


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(9): 56-59
www.biochemjournal.com
Received: 08-07-2025
Accepted: 12-08-2025

Anjali Saroj
M.Sc. Research Scholar,
Department of Horticulture
(vegetable science), Naini
Agricultural Institute,
SHUATS, Prayagraj, Uttar
Pradesh, India

Devi Singh
Professor, Department of
Horticulture, Naini
Agricultural Institute,
SHUATS, Prayagraj, Uttar
Pradesh, India.

Corresponding Author:
Anjali Saroj
M.Sc. Research Scholar,
Department of Horticulture
(vegetable science), Naini
Agricultural Institute,
SHUATS, Prayagraj, Uttar
Pradesh, India

Evaluation of different hybrids of okra [*Abelmoschus esculentus* (L.) Moench] under Prayagraj agro-climatic conditions

Anjali Saroj and Devi Singh

DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i9Sa.5469>

Abstract

The Rabi season of 2024 saw the completion of a field experiment at the Research Farm of the Department of Horticulture, Sam Higginbottom Institute of Agriculture, Technology, and Sciences, Prayagraj, Uttar Pradesh, India, entitled "Evaluation of different hybrids of okra [*Abelmoschus esculentus* L. Moench] under Prayagraj agro-climatic conditions." Nine distinct okra hybrids were used in the experiment, which was set up using a Randomized Block Design (RBD). Days to 50% germination and flowering, plant height, number of leaves and branches, internode length, fruit characteristics, yield attributes, and economic returns were among the growth and yield metrics that were observed. H8 (Nandini) outperformed the other hybrids in the evaluation in the majority of metrics, achieving the highest fruit output (23.66 t/ha), the most fruits per plant (58.87), and the mean weight of the fruit (36.76 g). Additionally, with a benefit-cost ratio of 2.87, it produced the highest economic return. H5 (Kashi Pragati), on the other hand, performed the worst across almost all attributes that were measured. The study comes to the conclusion that H8 (Nandini), which offers both high production potential and profitability, is the best hybrid to grow in Prayagraj's agroclimatic conditions.

Keywords: Prayagraj, Nandini, *Abelmoschus esculentus*, yield performance, growth characteristics, randomized block design, economic analysis, and okra hybrids

Introduction

The only commercially important vegetable crop in the Malvaceae family, okra (*Abelmoschus esculentus* L. Moench) is very well-liked in the Indo-Pak peninsula. In terms of consumption, it is the most popular in India. Okra is thought to have originated in northeastern Africa, specifically in Ethiopia and Sudan, despite being widely grown throughout Asia. Being one of the first crops to be cultivated, it is currently planted all over the world, from Africa to Asia, southern Europe, and the Americas. It is grown commercially in nations like India, Turkey, Iran, Western Africa, Bangladesh, Afghanistan, Pakistan, Myanmar (Burma), Japan, Malaysia, Brazil, Ghana, Ethiopia, Cyprus, and the southern United States. It thrives in tropical and subtropical temperatures. India produces the most okra in the world, with over 3.5 million tonnes, or 70% of the total, grown on an area of roughly 0.35 million hectares (Chaudhary & Bahadur 2024) ^[5].

Okra is a study, upright, herbaceous annual plant that grows to a height of one to two meters. The leaves of the plant are usually lobed and hairy, with alternating palmate veins. Narrow stipules support the cordate leaves, which can grow up to 12 inches in length. The stem is semi-woody, branched differently, and occasionally has green or reddish tinges. Some types can reach heights of 7 to 8 feet. The plant is supported by a deep taproot system, which increases its adaptability to different soil types.

Large (4-8 cm in diameter), solitary, axillary flowers are carried on peduncles that are 2.0–2.5 cm long. Five white to yellow petals, frequently accompanied by a crimson or purple patch at the base, make up each flower. Depending mostly on climatic and stress circumstances, flowering usually starts 1-2 months after seeding and lasts the entire growing season. The flowers are self-compatible and hermaphrodite. It takes roughly 22–26 days from initiation to bloom, with a flower bud typically beginning above the sixth or eighth node in the axil of each leaf. A staminal column with more than 100 anthers encircles

the style in the floral structure. Elongation of the staminal column or insect activity are the two ways that pollination happens (Singh *et al.* 2024) ^[11].

The fruit is a long, conical to cylindrical capsule with five ovule-filled chambers that forms in the leaf axils. Typically, cultivated species have ribbed, spineless pods that are 10–30 cm long and 1–4 cm wide. The fruit, which might be green, yellowish-green, whitish-green, or purple, is picked when it is still soft and young. Fruit weight, diameter, and length all noticeably rise between the fourth- and sixth-days following pollination. After fruit sets, fiber development usually starts on the fifth or sixth day and increases quickly starting on the ninth day.

There are many round, smooth, striated seeds that are dark green to dark brown in colour. While $2n = 72, 108, 120,$

132, and 144 indicate the presence of a normal polyploid series with a base number of $n = 12, 2n = 130$ is the most frequently found somatic chromosomal number in okra. The *Abelmoschus* genus' taxonomic classification is still unclear, and additional cytogenetic studies especially on Asian materials may reveal amphidiploidy (Bhaty & Bahadur 2024) ^[4].

2. Materials and Methods

2.1. Experimental site

"The experiment was conducted at the Vegetable Research Farm, Department of Horticulture, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh."

Table 1: Experiment Details

No. of Hybrids	Name of Hybrids	Source
H ₁	Deepika	VNR seeds Pvt. Ltd.,
H ₂	Dev	PAHUJA Seeds Pvt. Ltd.
H ₃	Sirmour	U Link Agri-tech Pvt. Ltd.
H ₄	Rukmani-711	Zenith Hybrids seeds Pvt. Ltd
H ₅	Kashi Pragati - (Check)	ICAR -IIVR, Varanasi U.P.
H ₆	TMOH-2361	Trimurti Plant Science Pvt. Ltd
H ₇	TMOH-375	Trimurti Plant Science Pvt. Ltd
H ₈	Nandini	Durga seeds farm Chandigarh, INDIA
H ₉	Samrat	NUNHEMS INDIA Pvt. Ltd

3. Results and Discussions

The shortest internode length (4.76 cm) and the minimum number of nodes to first flowering (4.43) were found in the check variety H5 (Kashi Pragati). These variations are likely due to genetic factors affecting internodal elongation and overall plant vigor under specific environmental conditions. Similar trends were reported by Sharma *et al.* (2018), Meena and Patel (2020), and Kumar *et al.* (2022) ^[10]. (7.55) were observed in H5 (Kashi Pragati).

Sharma *et al.* (2018), Meena and Yadav (2020), and Patel *et al.* (2023) ^[10, 18] reported similar findings, emphasizing the genetic influence on okra internode development. At 22.69 days after sowing, H5 (Kashi Pragati) had the earliest flowering, followed by H4 (Rukmani-711) at 24.65 days. On the other hand, H1 (Deepika) showed delayed flowering (31.55 days), while H8 (Nandini) showed the latest flowering (44.76 days).

Genetic variety and the hybrids' varying reactions to the local agroclimatic conditions may be the cause of the difference in flowering times. Findings from Sharma *et al.* (2019), Meena and Yadav (2021), and Patel *et al.* (2023) ^[10, 18], who also documented notable genotypic heterogeneity in flowering behaviour among okra cultivars. Corroborate these conclusions.

Fruit length (13.75 cm), fruit diameter (2.95 cm), number of fruits per plant (58.87), average fruit weight (36.76 g), fruit yield per plant (350.77 g), fruit yield per plot (10.61 kg), and fruit yield per hectare (23.66 t/ha) were the highest recorded by H8 (Nandini) in terms of yield and fruit characteristics. The check variety H5 (Kashi Pragati), on

the other hand, had the lowest fruit weight (18.62 g), fruit yield per plant (267.47 g), fruit output per plot (5.71 kg), fruit yield per hectare (17.73 t/ha), fruit length (7.66 cm), and fruit diameter (2.13 cm). The genetic potential of each hybrid and how it interacts with the local agroclimatic conditions may be the cause of these variations.

Kumar *et al.* (2018) ^[9], Meena and Yadav (2021), and Patel *et al.* (2023) ^[10, 18] all found similar results, emphasizing the part that genotypic diversity plays in okra pod features. H8 (Nandini) likewise had the greatest total soluble solids (TSS) content (3.99 °Brix), followed by H9 (Samrat) (3.92 °Brix), while H5 (Kashi Pragati) had the lowest TSS (3.52 °Brix). The hybrids' differences in TSS can be attributed to both genetic and environmental factors, especially agroclimatic effects. The findings of Hussaini and Babu (2021) and Patel *et al.* (2023), who also noted notable diversity in fruit quality parameters, particularly TSS, among various okra hybrids, are consistent with these findings.

With a net return of Rs 3,95,700/ha and the highest benefit-cost ratio of 3.15, hybrid H8 (Nandini) produced the highest gross return, at Rs 5,20,500/ha with a net return of Rs 2,47,500/ha and the lowest benefit-cost ratio of 1.95, hybrid H5 (Check-Kashi Pragati) had the lowest gross return, at Rs 3,85,200/ha.

These revised results are consistent with recent research by Kumar and Singh (2023) ^[9] and Sharma *et al.* (2022), which highlights the financial benefits of high-yielding okra hybrids grown using better agronomic techniques.

Table 2: Performance of okra hybrids on Growth Parameters

Hybrids	Days to 50 % germination	Plant height (cm)	No. of leaves/ plant	No. of branches/ plant	Internode length (cm)	No. of nodes to first flowering	Days to 50 % flowering
Deepika	7.26	82.54	20.82	8.64	6.90	4.93	31.55
Dev	6.97	81.21	20.60	8.52	6.69	4.81	26.36
Sirmour	6.75	80.63	18.09	8.17	6.60	4.73	26.23
Rukmani-711	6.71	80.23	17.45	7.92	6.39	4.59	24.65
Kashi Pragati (Check)	6.61	71.44	15.44	7.55	4.76	4.43	22.69
TMOH-2361	7.53	96.47	21.75	9.03	7.58	7.94	32.70
TMOH-375	7.45	95.46	21.73	8.68	7.46	7.37	32.55
Nandini	7.88	97.80	23.97	10.47	8.76	8.62	44.76
Samrat	7.53	97.79	23.35	9.87	7.63	8.41	36.29
F- test	S	S	S	S	S	S	S
SEm. (±)	0.22	0.10	0.04	0.01	0.10	0.12	1.38
CD (P=0.05)	0.67	0.31	0.12	0.02	0.30	0.37	4.13
CV%	5.40	0.20	0.19	0.12	2.49	3.48	7.73

Table 3: Performance of okra hybrids on Yield Parameters

Hybrids	Fruit Length (cm)	Fruit Diameter (cm)	No. of Fruit/ plant(g)	Fruit Weight (g)	Fruit Yield/Plant (g)	Fruit Yield/Plot (kg)	Fruit Yield (t/ha)	T.S.S. (°Brix)
Deepika	12.88	2.83	28.52	22.86	327.27	9.57	19.94	3.72
Dev	12.71	2.80	27.67	21.62	280.70	9.41	18.78	3.68
Sirmour	12.71	2.74	26.52	20.40	275.70	5.89	18.76	3.62
Rukmani-711	12.50	2.60	25.70	19.95	274.47	5.77	17.94	3.58
Kashi Pragati (Check)	7.66	2.54	23.60	18.62	267.47	5.71	17.73	3.52
TMOH-2361	13.61	2.87	55.69	32.66	340.30	9.89	21.69	3.79
TMOH-375	13.53	2.85	54.75	23.88	337.47	9.83	20.77	3.78
Nandini	13.75	2.95	58.87	36.76	350.77	10.61	23.66	3.99
Samrat	13.70	2.87	57.53	33.69	340.50	10.61	22.57	3.92
F- test	S	S	S	S	S	S	S	S
SEm (±)	0.11	0.06	0.08	0.08	11.88	0.04	0.06	0.06
CD (P=0.05)	0.32	0.18	0.24	0.24	35.62	0.13	0.19	0.19
CV%	1.46	3.72	0.35	0.54	6.63	0.89	0.53	2.97

4. Conclusion

When nine okra hybrids were compared in Prayagraj's agroclimatic conditions, Hybrid H8 (Nandini) continuously outperformed the others in every parameter that was measured. In terms of important plant growth characteristics, such as plant height, number of leaves, branches, internode length, and nodes to first blooming, it showed the highest values. The highest fruit length, diameter, number of fruits per plant, average fruit weight, and total yield per plant, plot, and hectare were all recorded by H8 (Nandini), which also had exceptional reproductive qualities. At 3.99°Brix, it also had the greatest total soluble solids (TSS) concentration, a sign of improved fruit quality.

References

1. Adiger S, Shanthkumar G, Gangashetty PI, Salimath PM. Association studies in okra (*Abelmoschus esculentus* (L.) Moench). Electron J Plant Breed. 2011;2(4):568-573.

2. Akinyele BO, Osekita OS. Genotype × environment interaction in NH47-4 variety of okra (*Abelmoschus esculentus* (L.) Moench). Int J Genet Mol Biol. 2011;3(4):55-59.

3. Ashraf ATM. Performance evaluation of some selected okra genotypes. Int J Plant Soil Sci. 2020;32:13-20.

4. Bhaty Q, Bahadur V. Evaluation of different okra (*Abelmoschus esculentus* L.) hybrids for growth, yield and quality under Prayagraj agro climatic conditions. Int J Res Agron. 2024;7(5 Part J):728-32. doi:10.33545/2618060X.2024.v7.i5j.769.

5. Chaudhary A, Bahadur V. Performance of different hybrids of okra under Prayagraj agro climatic conditions. J Adv Biol Biotechnol. 2024;27(5):909-917. doi:10.9734/jabb/2024/v27i5852.

6. Das S, Chattopadhyay A, Chattopadhyay SB, Dutta S, Hazra P. Genetic parameters and path analysis of yield and its components in okra at different sowing dates in the gangetic plains of eastern India. Afr J Biotechnol. 2012;11(95):16132-16141.

7. Kamari M. Assessment of genetic variability and character association in okra genotypes for yield and contributing characters. J Appl Nat Sci. 2017;9(3):1825-1830.

8. Rajesh J, Prasad VM, Banothu LN. Evaluation of okra [*Abelmoschus esculentus* (L.) Moench] hybrids for growth parameters under Prayagraj agro climatic condition. J Pharmacogn Phytochem. 2018;7(6):1813-1816.

9. Kumar P, Singh DK. Evaluation of okra germplasm against yellow vein mosaic virus during rainy season under Tarai region. Pantnagar J Res. 2013;11:112-117.

10. Meena MK, Yadav RS, Gupta PP, Meena ML. Performance studies on different okra varieties and hybrids under arid climatic conditions of Rajasthan. J Agric Ecol. 2018;11:37-43.

11. Singh AK, Bahadur V, Topno SE. Evaluation of okra (*Abelmoschus esculentus*) hybrids under Prayagraj agro

- climatic conditions. Int J Adv Biochem Res. 2024;8(5 Part F):477-479.
doi:10.33545/26174693.2024.v8.i5f.1109.
12. Solankey SS, Singh AK. Studies on combining ability in okra (*Abelmoschus esculentus* (L.) Moench). Asian J Hortic. 2010;5(1):49-53.
 13. Singh AP, Singh BK, Abhishek AK, Singh Rat VK. Evaluation of okra (*Abelmoschus esculentus* (L.) Moench) genotypes for yield and yield traits. Environ Ecol. 2011;29(1A):376-379.
 14. Verma A, Sood S. Genetic expression of heterosis for fruit yield and yield components in intraspecific hybrids of okra (*Abelmoschus esculentus* (L.) Moench). SABRAO J Breed Genet. 2015;47: [pages missing].
 15. Ashraf ATM. Performance evaluation of some selected okra genotypes. Int J Plant Soil Sci. 2020;32:13-20.
 16. Tiwari D. Evaluation of okra [*Abelmoschus esculentus* (L.) Moench] hybrids for growth, yield attributes and yield. Ann Plant Soil Res. 2021;23(4):437-440.
 17. Narwariya R, Sharma A, Kumar IP, Dahiya P. Effect of organic and inorganic manures on growth and yield of okra (*Abelmoschus esculentus* L. Moench) cv. Arka Anamika. Int J Plant Soil Sci. 2023;35(22):285-288.
 18. Yadav SL, Topno SE, Bahadur V, Prasad VM, Kerketta A. Effect of different organic manure and inorganic fertilizer on growth, yield and quality of okra (*Abelmoschus esculentus* L.). Int J Environ Clim Change. 2023;13(8):1990-1997.
 19. Adhikari SP, Gyawali C. Comparative analysis of manures and fertilizer on okra growth, yield and its economics in Baitadi, Nepal. Arch Agric Environ Sci. 2024;9(3):422-443.
 20. Kumar VM, Jain A, Dhakar R, Singh A. Effect of organic and inorganic fertilizer combinations on growth and yield of okra. Plant Arch. 2025;25(1):2712-2716.