Journal of Advances in Biology & Biotechnology

Volume 27, Issue 8, Page 708-713, 2024; Article no.JABB.120567
ISSN: 2394-1081

Evaluation of Different Genotypes of Cucumber (*Cucumis sativus*) for Different Traits

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/jabb/2024/v27i81188

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/120567

Original Research Article

Received: 27/05/2024
Accepted: 29/07/2024
Published: 31/07/2024

ABSTRACT

The present study was conducted at the Main Experimental Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj during the *Zaid* season of 2023. Planting material consisted of 30 genotypes of cucumber including one check namely Pusa Uday laid out in Completely Randomized Block Design with three replications. Evaluation was done for fourteen different traits viz., days to first male flower appear, days to first female flower appear, node number at which female flower appear, days to first fruit harvest, number of primary branches per plant, inter-nodal length, vine length, fruit length, fruit diameter,

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Cite as: *Ram, Sonu, Aastik Jha, Anurag Singh, Abhishek Singh, and Suraj Luthra. 2024. "Evaluation of Different Genotypes of Cucumber (Cucumis Sativus) for Different Traits". Journal of Advances in Biology & Biotechnology 27 (8):708-13. https://doi.org/10.9734/jabb/2024/v27i81188.*

average fruit weight, T.S.S, number of fruit per plant, fruit yield per plant (kg), fruit yield per hectare (q). The genotypes NDCU-23-1 (143.13q) followed by NDCU-23-11 (135.90q) and NDCU-23-12 (131.53q) performed better than the check variety i.e. Pusa Uday in term of fruit yield per plant.

Keywords: Cucumber; genotypes; evaluation; replication.

1. INTRODUCTION

Cucumber (*Cucumis sativus* L.) is important summer season vegetable crop commonly known as kheera. It has a diploid chromosome number of 2n=2x=14 and its fruits are botanically classified as seeded pepo. It is indigenous to India [1] with chief evidence backed by the finding of *Cucumis hardwickii* Royle, a small bitter cucumber-like plant in the foothills of Himalayas. India being native place of cucumber is endowed with enormous genetic variability in its vegetative and fruit characters [2]. Cucumber is primarily an annual warm-season crop that can be cultivated in both tropical and subtropical climates. It is typically grown twice a year, during the summer and rainy seasons [3-5].

It has very high water content about 90 – 95% and hence satisfies thirst, has cooling effect and prevents indigestion. It has therapeutic properties for treating jaundice and prevention of constipation.

Immature fruit are consumed as salad and sell at a premium price in off- season. Fruit varies in shape, size and colour and are considered nutritious. They contain 0.4% protein, 2.5% carbohydrates, 1.5mg iron and 2mg of vitamin C per 100g fresh weight. Thamburaj and Singh, [6] Recently, one new improved variety Pusa Long Green (DC-83) has been released and recommended by AICRP (vegetable crops) for commercial cultivation in Punjab, Uttar Pradesh, Bihar and Jharkhand during both spring summer and *kharif* season based on multi location trail. It was noted that apart from superior quality characters, Pusa Long Green (DC-83) showed 34.93% higher yield (Average yield under normal conditions is 18.93 t/ha) over the National check variety Pant Khira-1. Our study was also to find out different traits among 30 genotypes of cucumber.

2. MATERIALS AND METHODS

The final experimental materials comprising thirty genotypes were sown in Completely Randomized Block Design (CRBD) with three replications during *Zaid*, 2023 at MES Department of Vegetable Science ANDUA&T, Ayodhya. Each treatment consisted of twelve plants in two rows, having spacing of 1.5 x 0.6 m with net plot size of 3.0 × 3.0 m^2. Seeds of thirty genotypes of cucumber were sown during third week of March. The crop was cultivated following recommended cultural practices.

The data were collected on fourteen character such as days to first male flower appear, days to first female flower appear, node number at which first female flower appear, days to first fruit harvest, number of primary branches per plant, inter-nodal length (cm), vine length (m), fruit length (cm), fruit diameter (cm), average fruit weight (g), number of fruits per plant**,** fruits yield per plant (kg), fruits yield per hectare (q), total soluble solids (°brix).

3. RESULTS AND DISCUSSION

NDCU-23-1 reported minimum days to first male flower appearance (29.13) followed by NDCU-23-11 (29.37), while VRCU-2218 (45.03) took maximum days to first male flower appear followed by VRCU-2247 (44.40). Study conducted by Mishra et al. [7] showed similar result where he observed days to first male flower appears ranged from 38.33 to 44.67. Minimum days to first female flower appearance after seed sowing reported by NDCU-23-1 (32.60) followed by NDCU-23-4 (34.57), whereas VRCU-2218 (51.13) followed by VRCU-2246 (50.91) took maximum days. Genotype NDCU-23-1 (5.77) followed by NDCU-23-11 (6.45) recorded the lowest node number at which first female flower appear whereas VRCU-2218 (12.63) followed by VRCU-2212 (11.97) recorded maximum number for node number at which first female flower appear. Similar observation was reported by Yadav et al. [8] where he reported that node number to first female flower appear range from 3.00 to 11.33. Maximum number of primary branches per plant at the time of final harvesting was reported by NDCU-23-1 (2.50) followed by NDCU-23-12 (2.40), while VRCU-2226(1.00) followed by VRCU-2219 (1.03) showed minimum number of primary branches per plant. Similar result was observed by Kumari et al. [9] where she was found that number of

Table 1. Mean performance of 30 genotypes for fourteen characters in cucumber

Genotypes	Days to first male flower appear	Days to first female flower appear	Node no at which first female flower appear flower appear	Days to first fruit harvest	No of primary branches per plant	Inter-nodal length	Vine length	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	No of fruits per plant	T.S.S	Fruit yield per plant (kg)	Fruit yield per hectare(q)
NDCU-23-1	29.13	32.60	5.77	39.30	2.50	7.01	2.38	16.62	5.03	199.06	9.00	1.86	1.79	143.13
NDCU-23-2	31.33	35.80	6.63	45.70	2.07	8.52	1.80	15.71	3.85	189.04	7.20	2.06	1.36	108.73
NDCU-23-3	33.80	38.00	9.37	47.67	1.90	7.50	1.60	14.86	4.15	165.87	6.13	1.89	1.01	81.18
NDCU-23-4	30.93	34.57	6.53	41.67	1.70	7.43	1.90	15.71	4.97	191.23	8.88	1.84	1.62	129.18
NDCU-23-5	39.40	43.17	9.87	52.43	1.57	9.74	1.73	15.04	3.66	154.71	6.60	1.97	1.02	81.49
NDCU-23-6	43.87	47.97	9.13	57.33	1.77	7.15	1.98	14.01	4.45	150.23	7.27	1.92	1.09	87.15
NDCU-23-7	37.40	41.07	8.37	50.87	1.60	8.21	1.86	13.39	4.08	160.41	7.33	1.77	1.17	93.84
NDCU-23-8	35.60	40.23	8.60	48.77	1.30	7.26	2.06	14.61	3.57	156.45	6.73	1.74	1.13	90.13
NDCU-23-9	33.87	37.73	7.63	46.13	1.40	6.47	1.86	15.05	4.31	163.60	6.80	1.87	1.12	89.46
NDCU-23-10	34.33	36.60	10.23	47.47	1.67	8.39	1.91	11.75	3.64	161.80	7.47	1.84	1.20	96.27
VRCU-2203	39.67	44.57	9.47	54.85	1.33	9.66	1.78	14.19	4.64	156.47	7.53	1.63	1.18	94.27
VRCU-2205	41.60	49.23	7.80	58.37	1.20	8.92	1.69	15.52	3.91	153.71	7.93	1.88	1.22	97.93
VRCU-2209	35.93	41.47	8.47	53.27	1.40	7.14	1.76	15.67	3.65	147.97	7.20	1.87	1.07	85.29
VRCU-2210	38.53	46.93	10.10	57.27	1.70	7.04	1.83	14.27	3.76	156.83	7.47	1.89	1.17	93.93
VRCU-2212	43.17	48.13	11.97	58.67	1.50	7.27	1.75	14.44	4.27	145.03	6.87	1.60	0.99	79.48
VRCU-2213	41.13	45.73	9.97	56.87	1.07	7.97	1.85	15.40	3.68	150.20	6.93	1.72	1.06	84.51
VRCU-2217	41.77	44.90	9.20	55.33	1.50	8.60	1.99	15.47	4.48	143.05	7.53	1.79	1.07	85.80
VRCU-2218	45.03	51.13	12.63	60.27	2.00	9.01	1.78	16.96	4.28	149.45	8.00	1.83	1.21	96.72
VRCU-2219	42.30	46.93	8.43	57.87	1.03	9.73	1.72	15.47	4.34	152.79	9.00	1.59	1.38	110.46
VRCU-2224	38.00	43.10	8.60	53.40	1.23	8.83	1.75	15.44	4.46	162.34	7.00	1.68	1.14	90.78
VRCU-2226	42.83	47.33	10.33	57.93	1.00	9.10	1.77	14.60	3.75	138.29	8.93	1.42	1.24	99.19

Genotypes	Days to first male flower appear	Days to first female flower appear	Node no at which first female flower appear flower appear	Days to first fruit harvest	No of primary branches per plant	Inter-nodal length	Vine length	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	No of fruits per plant	T.S.S	Fruit yield per plant (kg)	Fruit yield per hectare(q)
VRCU-2236	41.93	46.43	10.13	58.20	1.30	8.81	1.73	15.03	4.01	144.87	7.67	1.44	1.11	88.60
VRCU-2244	39.20	44.77	8.87	54.80	2.00	8.05	1.93	14.70	4.51	160.54	8.40	1.58	1.35	107.92
VRCU-2245	40.97	45.70	7.83	56.60	1.68	8.32	1.70	15.60	3.74	151.16	7.53	1.74	1.14	91.05
VRCU-2246	43.47	50.91	11.53	60.43	1.33	9.38	1.63	14.13	4.60	158.44	6.80	1.74	1.08	86.51
VRCU-2247	44.40	49.10	9.40	58.20	1.70	7.63	1.73	14.43	3.52	170.83	5.93	1.65	1.01	80.98
VRCU-2249	43.60	48.23	10.07	59.87	1.82	7.57	1.83	14.39	3.80	148.85	6.73	1.70	1.00	79.73
NDCU- 23-11	29.37	34.87	6.45	44.00	2.35	8.08	2.00	16.15	4.72	192.43	8.80	1.90	1.70	135.90
NDCU-23-12	30.83	35.17	6.57	43.68	2.40	7.78	1.93	15.83	4.67	194.23	8.63	1.80	1.64	131.53
Pusa Uday (Check)	31.87	36.27	7.52	44.17	2.00	6.13	1.88	15.55	4.61	185.40	8.47	1.83	1.57	125.43
Mean	38.18	42.95	8.92	52.71	1.63	8.09	1.84	15.00	4.17	161.84	7.56	1.77	1.23	98.22
C.V.	6.68	6.76	6.53	5.62	6.36	6.44	8.64	8.26	8.20	6.16	11.99	3.64	12.27	10.96
S.E.	1.47	1.68	0.34	1.71	0.06	0.30	0.09	0.72	0.20	5.76	0.52	0.04	0.09	6.22
C.D. 5%	4.17	4.74	0.95	4.84	0.17	0.85	0.26	2.02	0.56	16.30	1.48	0.11	0.25	17.60
C.D. 1%	5.55	6.31	1.27	6.44	0.23	1.13	0.35	2.69	0.74	21.69	1.97	0.14	0.33	23.42
Range Lowest	29.13	32.60	5.77	39.30	1.00	6.13	1.60	11.75	3.52	138.29	5.93	1.42	0.99	79.48
Range Highest	45.03	51.13	12.63	60.43	2.50	9.74	2.38	16.96	5.03	199.06	9.00	2.06	1.79	143.13

primary branches per plant ranged 1.63 to 2.97. Maximum inter-nodal length was assessed in NDCU-23-5 (9.74) followed byVRCU-2219 and minimum inter-nodal length was observed for Pusa Uday (6.13) followed by NDCU-23-9 (6.47). In a Similar result found by Mishra et al. [7] where he reported that inter-nodal length ranged 7.33 to 12.00. Genotype NDCU-23-1 (2.38m) closely followed by NDCU-23-8 (2.06m) recorded longest vine length at the time of final harvest.in contrast, NDCU (1.60m), followed by VRCU-2205 (1.69m) recorded minimum vine length. Bhaiya et al. [10] where he founded that vine length ranged 1.18 to 2.73. Data regarding various traits are represented in Table 1.

NDCU-23-1 (39.30) showed earliness for days to first fruit harvest followed by NDCU-23-4 (41.67) and VRCU-2246 (60.43) took maximum days to first fruit harvest followed by VRCU-2218 (60.27). Similar result was observed by Bhaiya et al. [10] where he founded that days to first fruit harvest ranged 47.63 to 60.50. In case of fruit length, genotype VRCU-2218 (16.95cm) followed by NDCU-23-1 (16.62cm) showed longest fruit length while it was minimum for NDCU-23-10 (11.75cm) followed by NDCU-23-7 (13.39cm). Similar result was observed by Kumari et al. [9] where she was found that fruit length ranged 10.20 to 18.68. Genotype NDCU-23-1 (5.03) followed by NDCU-23-4 (4.97) showed maximum fruit diameter, whereas it was minimum in VRCU-2247 (3.52) followed by NDCU-23-8 (3.57). Result of average fruit weight showed that it was maximum in NDCU-23-1 (199.06g) closely followed by NDCU-23-11 (192.43g) and minimum in VRCU-2226 (138.28g) followed by VRCU-2217 (143.05g). These findings are consistent with Mishra et al. [7] where he reported that range of average fruit weight was 127.33 to 184.33. Maximum number of fruits per plant was found in NDCU-23-1 (9.00) followed by VRCU-2226 (8.93) while it was minimum for VRCU-2247 (19.33) followed by NDCU-23-3 (6.13). NDCU-23-1 (1.79kg) followed by NDCU-23-11 (1.70kg) showed highest fruit yield per plant whereas VRCU-2212 (0.99kg) followed by VRCU-2249 (1.00kg) showed minimum yield per plot. Maximum number of fruits yield per hectare (q) was found in NDCU-23-1 (143.13) followed by NDCU-23-11 (135.90) while it was minimum for VRCU-2212 (79.48) followed by VRCU-2249 (79.73). Similar observation was reported by Yadav et al. [8] where he founded that fruit yield per hectare ranged 104.6 to 346.46. Data regarding various traits are represented in Table 1.

4. CONCLUSION

Cucumber (*Cucumis sativus*.) is one of the major summer season cucurbitaceous crops. This study aimed to evaluate 30 genotypes of cucumber for fourteen traits. The genotypes NDCU-23-1 followed by NDCU-23-11and NDCU-23-12 performed better than the check variety i.e. Pusa Uday in term of fruit yield per plant. The result shows a wide range of variation in almost all economically important traits, indicating substantial potential for improvement through various breeding methods.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

ACKNOWLEDGEMENT

It is a uniquely proud privilege to me for expressing my deep emotion & immense gratitude to my Major Advisor Dr. Aastik Jha, Assistant Professor Department of Vegetable Science for his meticulous guidance, constant inspiration and encouragement, incessant, forbearance, peerless criticism coupled with befitting counsels throughout the investigation and preparation of this manuscript. I simply felt blessed to be provided with an academic advisor like him.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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