Evaluation of different Genotypes of Cucumber (*Cucumis sativus*) for Yield and its Contributing Traits

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, 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 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.

Keyword:Cucumber, genotypes, evaluation, replication.

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 (De Candolle, 1982)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 (Pati *et al*., 2015). China is considered the secondary center for diversity of cucumber (Sebastina*et al.,* 2010).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. In north India plains, crop is sown in (February-March) and rainy (June-July) season.

It is an ideal summer vegetable crop chiefly grown for its edible tender fruits, preferred as a salad ingredient, pickles, and as a cooked vegetable (Shah *et. al.,* 2016)**.** 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, 2018).

Materials and Methods

The final experimental materials comprising thirty genotypes were sown in Completely Randomized Block Design (CRBD) with three replications during *Zaid,* 2023. 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 conducted by Department of Vegetable Science, ANDUA&T, Ayodhya.

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).

Results and Discussion

NDCU-23-1 reported minimum days to first male flower appearance29.13) 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.* (2021) 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.Similar result was found by Mishra *et al.* (2021) that days to first female flower appear range from 45.33 to 52.67.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.* (2021) 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.* (2020) where she was found that number of 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.* (2021) 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.* (2020) where he founded that vine length ranged 1.18 to 2.73. Data represented under 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.* (2020) 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.* (2020) 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 byNDCU-23-8 (3.57). The result is in line with Yadav *et al.* (2021) where he reported that fruit diameter ranged 3.9 to 5.51.Result of average fruit weight showed that it was maximum in NDCU-23-1 (199.06g) closely followed by NDCU-

23-11(194.23g) and minimum in VRCU-2226 (138.28g) followed by VRCU-2217 (143.05g). These findings are consistent withMishra *et al.* (2021) 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). Similar observation was reported by Yadav *et al.* (2021) where he reported that number of fruits per plant ranged 4.13 to 12.13.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. Similar result was observed by Bhaiya *et al.* (2020) where he founded that fruit yield per plant ranged 1.01 to 1.83.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.* (2021) where he founded that fruit yield per hectare ranged 104.6 to 346.46. Data represented under Table 1.

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	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
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
PusaUday (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

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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.

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