



Evaluation of Different Genotypes of Cowpea (*Vigna unguiculata* (L.) Walp.) for Growth and Pod Yield in Prayagraj Agro-climatic Conditions

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Authors' contributions

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

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ABSTRACT

This experiment was conducted at a Horticulture research farm in the year 2021. Nine genotypes of cowpea were procured from IIVR, Varanasi viz AVT I 2021/ COPBVAR-1, AVT I 2021/ COPBVAR-2, AVT I 2021/ COPBVAR-3, AVT 2021/ COPBVAR-4, AVT I 2021/ COPBVAR-5, AVT I 2021/ COPBVAR-6, AVT I 2021/ COPBVAR-7, GOMATI, KASHI KANCHAN. The experiment was laid in simple RBD with thrice replications. The observations were recorded on different traits. AVT I 2021/ COPBVAR-6, was found to be the best variety over all other varieties in terms of earliness viz days

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to first flowering (33.33 days) and days to 50% flowering (38.67 days), AVT I 2021/ COPBVAR-5 was found to be the best variety over all other varieties in terms of yield parameters viz. yield per plant (168.03g) and yield were (9168.03 q/h).

Keywords: Cowpea; genotypes; earliness; yield; pod quality.

1. INTRODUCTION

“Cultivated cowpea, also called yard-long bean (*Vigna unguiculata* (L.) Walp.) is a commonly grown and consumed grain legume vegetable. It is most commonly cultivated for its tender green long pods and also for seeds” [1]. “It belongs to the family Leguminosae with a chromosome number of $2n-2x$ 22 suggesting there was enough evidence to show that cultivated cowpea was domesticated in West or Central Africa. The crop is mainly cultivated in intercropping system where its low plant population does not allow the full expression of the yield potential of the cultivars being grown. Accumulation of different desirable traits spread over the diverse genotypes into one genotype is important for the rapid advancement in yield improvement of any crop [2,3]. Considerable challenges affect the production of this crop despite its comparatively better adaptation to harsh environments. Being a legume, cowpea fixes atmospheric nitrogen. some of which it uses for its growth and development and leaves some in the soil for the benefit of companion and following crops” [4]. “Different kinds of vegetables are cultivated in India over the years. With an estimated annual production of about 162.18 million tonnes from an area of 92.05 lakh ha and a productivity of 17.6 MT/ha, our country is the second largest producer of vegetables after China, with an estimated annual production of about 162.18 million tonnes from an area of 92.05 lakh ha and a productivity of 17.6 MT/ha” (Anonymous, 2014). “In India, however, per capita vegetable availability is around 275g/day/capita, compared to a minimum requirement of 300g/day/capita” (Anonymous, 2012). “Cowpeas have been grown in India since ancient times. Lobia (Hindi), Barbati (Bengali), Urohi (Assami), Sonta (Garhwali), Chavati (Marathi), Alasanda (Telugu), and Manpyar are some of the local names for it (Malayalam). Cowpea is one of the most significant vegetable crops cultivated during the rainy and summer seasons among legumes. When dried, tender pods and green-shelled seeds are consumed as a vegetable and a pulse. It can also be used as a green manure, fodder, cover, or catch crop. Considering the nutritive

value, 100g of green pods of cowpea contain energy (34.00 kcal), protein (4.20mg), calcium (10.00mg), iron (4.70mg), vitamin A (2.40mg), vitamin C (35.00 mg) and is also a good source of Lysine (Anonymous, 2006). There is a need to intensify the development of high-yielding cultivars to increase cowpea production. To plan appropriate breeding programme and to evolve high-yielding cultivars with resistance to pests and diseases, the plant breeders must possess adequate knowledge of variability, character association patterns, the extent of contribution of each character to fruit yield and genetic variability [5-7]. As the information on the nature and magnitude of variability for yield other characters present in germplasm pool owing to genetic and non-genetic causes, is an important basic pre- requisite for starting any systematic breeding programme in identifying superior lines or varieties [8-11]. Being a legume, cowpea fixes atmospheric nitrogen. some of which it uses for its growth and development and leaves some in the soil for the benefit of companion and following crops” [4].

Keeping in view the afore mentioned facts, the present experiment entitled “Evaluation of Different genotype of Cowpea (*Vigna unguiculata* (L.) Walp.) for Growth and Pod Yield in Prayagraj Agro-climatic conditions” was carried out at Vegetable Research Farm, Department of Horticulture, SHUATS, Prayagraj during 2021-22 with following objectives.

2. MATERIALS AND METHODS

The present investigation was carried out with 9 genotypes of cowpea collected from different sources in Table 1. The experiment was conducted in randomized block design with three replications during the kharif season of the year 2021, at Vegetable Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj (U.P.). All the facilities necessary for cultivation, including labour were made available in the Department. The details of the materials used and the methods adopted for this study are presented in this chapter.

Table 1. Experimental details

Notation	Genotype	Source
G1	AVT - I 2021/ COPBVAR-1	IIVR, Varanasi, Uttar Pradesh, India
G2	AVT -I 2021/ COPBVAR-2	IIVR, Varanasi, Uttar Pradesh, India
G3	AVT -I 2021/ COPBVAR-3	IIVR, Varanasi, Uttar Pradesh, India
G4	AVT - I 2021/ COPBVAR-4	IIVR, Varanasi, Uttar Pradesh, India
G5	AVT - I 2021/ COPBVAR-5	IIVR, Varanasi, Uttar Pradesh, India
G6	AVT -I 2021/ COPBVAR-6	IIVR, Varanasi, Uttar Pradesh, India
G7	AVT -I 2021/ COPBVAR-7	IIVR, Varanasi, Uttar Pradesh, India
G8	GOMATI	IIVR, Varanasi, Uttar Pradesh, India
G9	KASHI KANCHAN	IIVR, Varanasi, Uttar Pradesh, India

3. RESULTS AND DISCUSSION

3.1 Number of Days to Germination

The Number of days to germination varied from 6.00 to 3.00. The maximum days to germination were recorded in the AVT I 2021/ COPBVAR-1(5.00), followed by (4.66) in the AVT I 2021/ COPBVAR-3 and minimum days to germination (3.00) was recorded in AVT I 2021/ COPBVAR-2, AVT I 2021/ COPBVAR-4, AVT I 2021/ COPBVAR-5, AVT I 2021/ COPBVAR-6, GOMATI and KASHI KANCHAN.

3.2 Plant Height at 60 Days

The plant height at 60 days varied from 108.67 cm to 49.27 cm. "The Maximum Plant height at 60 days (108.67) was recorded in KASHI KANCHAN, followed by AVT I 2021/ COPBVAR-7(97.33). and the minimum Plant height at 60 days (49.27 cm) was recorded in the AVT I 2021/ COPBVAR-2". kandel P et al. [12].

3.3 Number of Branches per Plant

The number of branches per plant varied from 14.87 to 6.90 "The Maximum Number of Branches per plant (14.87) was recorded in the KASHI KANCHAN, followed by GOMATI (12.30) and the minimum Number of Branches per plant (6.90) was recorded in the AVT I 2021/ COPBVAR-4" Sharma P et al. (2019).

3.4 Days to First Flowering

The number of days to first flowering varied from 37.67 to 33.01 Minimum days to first flowering (33.01) was recorded in AVT I 2021/ COPBVAR- 5, followed by AVT I 2021/COPBVAR - 4 (36.22). And the Maximum number of days to First Flowering (37.67) was recorded in the AVT I 2021/ COPBVAR-2. Similar findings were previously reported by Sharma P et al. (2019).

3.5 Days to 50% Flowering

The number of days to 50 % flowering varied from 38.67 to 44.67 Minimum number of Days to 50% Flowering (38.67) was recorded in the AVT I 2021/ COPBVAR- 5, followed by GOMATI (42.03) and the maximum number of days to 50 % Flowering (44.33) was recorded in the AVT I 2021 / COPBVAR-7. Similar findings were previously reported by Subedi S et al. (2019).

3.6 Pods per Cluster

The number of pods per cluster varied from 3.40 to 2.33. "The maximum number of pods per cluster (3.40). was recorded in the AVT I 2021 / COPBVAR-7, followed by AVT I 2021/ COPBVAR-2 (3.13) and the minimum number of pods per cluster (2.33) was recorded in the AVT I 2021/ COPBVAR-6" Subedi S et al. (2019).

3.7 Pod Diameter

"The Pod diameter varied from 7.08mm to 4.84mm. Maximum pod diameter (7.08 mm) was recorded in the AVT I 2021/ COPBVAR-2, followed by AVT I 2021/ COPBVAR-6 (6.92mm) and minimum pod diameter (4.84mm) was recorded in AVT I 2021/ COPBVAR-5" Gupta S et al. (2019).

3.8 Pod Length

The Length of the pod varied from 31.07CM to 10.77cm. "Maximum pod length (31.07cm) was recorded in the GOMATI, followed by AVT I 2021/COPBVAR-6 (27.93 cm) and minimum pod length (10.77cm) was recorded in the AVT I 2021/COPBVAR-5" Gupta S et al. (2019).

3.9 Pods Weight

The weight of 10 pods varied from 110.11 grams to 28.94 grams. The maximum weight of 10 pods (110.11g) was recorded in the GOMATI, followed AVT I 2021/COPBVAR-6, and the minimum of 10 pods weight (22.44g) was recorded in the AVT I 2021/COPBVAR-1. Similar findings were previously reported by Gupta S et al. (2019).

Table 2. Performance of different genotypes and varieties of cowpea for different traits

Notation	Genotype / Varieties Names	Days to germination	Plant height at 20 days	Plant height at 40 days	Plant height at 60 days	No of branches Per plant	Days to first flowering	Days to 50% flowering	Pods per cluster	Pod diameter	Pod length	10 Pods weight	Pods per plant	Pod Yield Per Plant in grams	Pod Yield/ha-1 in quintals
G1	AVT I 2021/ COPBVAR-1	6.00	18.92	36.2	59.24	7.50	33.67	39.01	2.73	6.61	26.07	72.57	10.33	70.51	70.51
G2	AVT I 2021/ COPBVAR-2	3.00	22.51	35.93	49.27	6.98	37.67	43.67	3.13	7.08	18.7	79.96	12.67	101.23	101.23
G3	AVT I 2021/ COPBVAR-3	4.67	29.57	38.47	57.21	7.30	37.14	40.67	2.53	6.61	27.9	67.67	19.05	128.57	128.57
G4	AVT I 2021/ COPBVAR-4	3.00	25.8	41.4	61.67	6.90	36.22	40.01	3.00	6.15	15.87	56.67	18.67	105.07	105.07
G5	AVT I 2021/ COPBVAR-5	3.00	39.25	61.47	85.67	7.87	33.01	38.67	2.93	4.84	10.77	28.94	25.33	71.18	71.18
G6	AVT I 2021/ COPBVAR-6	4.00	24.25	37.21	54.35	7.93	33.33	39.22	2.80	6.92	27.93	89.66	14.67	131.8	131.8
G7	AVT I 2021/ COPBVAR-7	3.00	45.57	66.20	97.33	7.97	37.02	44.33	3.40	5.29	14.59	31.3	18.65	67.20	67.2
G8	GOMATI	3.50	48.29	51.73	93.13	12.30	33.67	42.03	3.12	6.49	31.07	110.11	20.33	106.41	106.41
G9	KASHI KANCHAN	3.00	43.52	57.67	108.67	14.87	34.67	43.67	2.81	6.27	23.37	51.94	14.33	168.03	168.03
	F Test	S	NS	S	S	S	S	S	S	S	S	NS	S	S	S
	SE (d)	0.16	3.06	3.60	4.8	0.37	0.91	1.19	0.24	0.21	0.67	3.5	2.22	16.44	16.44
	CD 5%	0.32	7.11	7.30	9.88	0.74	1.83	2.39	0.49	0.43	1.34	7.1	4.47	35.13	35.13
	CV%	6.33	8.92	9.23	9.08	5.21	3.22	3.58	10.64	4.03	3.59	6.37	13.55	17.51	17.51\

3.10 Pods per Plant

The number of pods per plant varied from 25.33 to 10.33. The maximum Number of pods per plant (25.3) was recorded in the AVT I 2021/ COPBVAR- 5, followed by AVT I 2021/ COPBVAR – 5(25.33) and minimum Number of pods per plant (10.33) was recorded in AVT I 2021/COPBVAR-1. Similar findings were previously reported by Kandel P et al. [12].

3.11 Pod Yield per Plant in Grams

Maximum yield per plant (168.03Grams) was recorded in the KASHI KANCHAN, followed by AVT I 2021/ COPBVAR-3 (128.57), AVT I 2021/ COPBVAR- 4 (105.07g), AVT I 2021/ COPBVAR- 6 (131.8 g), are statistically at par. The minimum Yield per plant (67.20 g) was recorded in the AVT I 2021/ COPBVAR-7. Similar findings were previously reported by Kandel P et al. [12].

3.12 Pod Yield per Hectare in Quintals

Maximum yield per plant (168.03g) was recorded in the KASHI KANCHAN, followed AVT I 2021/ COPBVAR-3 (128.57), AVT I 2021/ COPBVAR- 4 (105.07g), AVT I 2021/ COPBVAR- 6 (131.8 g), are statistically at par. The minimum Yield per plant (67.20 grams) was recorded in the AVT I 2021/ COPBVAR-7. Similar findings were previously reported by Kandel P et al. [12].

4. CONCLUSION

The analysis of variance revealed significant differences between genotypes indicating presence of a sufficient amount of variability in all the characters. The mean replicated data on nine genotypes quantitative traits revealed Cowpea AVT I 2021/ COPBVAR- 5 was identified as desirable with high fruit yield per plant.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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