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Evaluation of Different Cowpea Varieties and Genotypes

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ABSTRACT

The present investigation on study of "Evaluation of different cowpea varieties and genotypes" was carried out during summer season in the year 2014-2015 The study was under taken on 30 varieties and genotypes of cowpea using randomized block design with three replication. The variety and genotypes found to be varied growth, yield and quality parameters. Among these 30 types maximum plant height was recorded in variety Akola selection (70.40 cm) were as minimum plant height was recorded in genotype CL-5 (26.33 cm). For days required to first flowers, maximum days taken by genotype CL-23 (71.33 days) were as the minimum days required for variety Vanita (40.80), similarly for days to 50 % flowering, genotype CL-23 recorded (75.40 days) and minimum for variety Vanita taken (45 days) . For number of green pods per cluster, maximum was recorded in AKCP-20 (3.53) followed by CL-14, were as was minimum was recorded in CL-10 (2.40). Similarly for number of pods per plant, maximum number of pods were recorded in CL-14 (87.80) followed by AKCP-20 (71.73), were as minimum was recorded in AKCP-99 (38.70). In case of Pod length, maximum was recorded in Gadchiroli local-2 (25.60) followed by Akola selection (25 cm) and minimum was recorded selection-5 (11.93). For yield characters average pod weight maximum pod weight for recorded in CL-24 (8.55 gram) were minimum was recorded in Gomati (4.10 gram).For yield per hectare maximum was recorded in CL-14 (157.69 quintal) minimum was recorded in Gomati (71.93 quintal). For protein content maximum protein content was recorded Arka samrudhi (23.80%) was minimum was recorded in Gadchiroli local-2 (15.88 %).

Key words: *Cowpea, Gomati, Genotypes, Varieties, Flowers.*

INTRODUCTION

Cowpea plays an important role in Indian diet. Green tender pods form an excellent nutritious vegetable and have the potential to solve the protein problem of human diet. It is also known as 'vegetable meat'[16]. Average yield of cowpea is very low in India, and year-to-year variation in yield is also remarkably high.

It is a versatile crop possessing high adaptability to extreme conditions of temperature, drought, tolerate alkaline soil conditions and posses high potential of Biological nitrogen fixation Therefore, introduction and evaluation of different cowpea performing better in rainfed as well as irrigated conditions and its improvement for yield and its contributing traits are of pivotal importance to get self sufficiency in pulses. Cowpea is shallow rooted crop end grown under less fertile soil.

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It thrives very well under moisture stress condition it has multipurpose uses and having wild ranges of adoptability to different agro climatic condition prevailing in India. Mostly, it is grown in Kharif in summer season in India and best suited as inter crop. Cowpea is an integral part of Indian diet. This poor yield may be due to unavailability of high yielding and stable genotypes along with appropriate advance agronomic management practices.

It has two types i.e. one that grows erect and other has spreading type of growth habits. It is therefore very important to develop cowpea varieties that are high and stable yielding, early maturing and insect pest resistant. The present study was thus under taken to find out yield potential of several promising cowpea genotypes for higher yield, early maturity and adaptability.

MATERIAL AND METHODS

The present investigation "Evaluation of different cowpea varieties and genotypes " (*Vigna unguiculata* (L.) Walp) was carried out at Main Garden, University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during summer season of the year 2014 -2015. The study was under taken on 30 varieties and genotypes of cowpea using randomized block design with three replication. Keeping a plot size of 3.5m x 1.16 m.

The experiment on cowpea was laid out in the plot No.15. The plot was selected on the basis of suitability of the land for cultivation of cowpea.

Source of plant materials

The 30 varieties of cowpea different region CL-14, CL-10, Arka suman, CL8,CL-3, CL-8, Divya, CL-24, Gomati, Vanita, Konkan Sadabahar, Gayatri, AKCP -20 (VN) Green selection, CL-13 ,C L-12, Selection – 5, CL-5 , Gadchiroli local -2, CL-23, Pusa komal, Kashi Kanchan, AKCP- 31 (SAR), AKCP-99 (SAR), Gadchiroli local (RS)-3, Akola selection, Baramasi, AKCR – 14 (Red), Arka samrudhi, CL-17, AKCP- f – 7. The data was recorded on following quantitative parameters plant height, first flower 50% flowering, Number cluster per plant, Number of Green pods for cluster, Number pods per plant, Pod length, Pod yield per hectare (q), Percentage of protein content.

RESULT AND DISCUSSION

Analysis of variance for Plant height showed highly significant differences among different genotypes. The data for plant height ranged from 26-70 cm. The genotype CL-5 was dwarf (26 cm) whereas Akola selection plants were taller (70 cm) Table: 1 (a). On the basis of phenotypic observation plant height showed positive relationship with maturity. Genotypes with early maturity produced dwarf plants, while genotypes with late maturity showed highest plant height. This variation might be attributed to the differences in the genotypes or might be due to environmental fluctuation. Similar results were reported by Ram *et al*[13]. Plant height reflects the canopy of plant spread contributing inactive photosynthetic activity of the plant, having indirect effect on seed yield. Plant with the spreading nature covers the ground and thus less or no moisture loss occurs. Thus plants having tall stature and spreading canopy are desirable for the area where there is scarcity of water. Our results are also supported by Thiyagarajan & Rajasekaran[17] who studied seven cultivars and their F1 for yield and found that dwarf to medium plants produced low yield as compared to medium to tall plants. Similarly Amanullah *et al*.[4], observed significant variation for plant height among 20 cowpea genotypes.

Regarding the character days taken for first flowering for all the 30 genotypes it ranged from 40.80 to 71.33 days was observed. The average number of days taken for first flowering was (54.53) days. The genotype Gomati was early to flower (40.80) days amongst all the genotypes followed by the genotypes Vanita (41.40), Akcp-f-7 (42.00), Gayatri (42.20) and Green selection (52.33) days. However maximum days required for flowering in genotype CL-23 (71.33 days). (Table:1 (a).

Pod length is important for the seed pod-1 and thus affect seed yield. Highly significant variations were observed for pod length among the tested genotypes .Pod length ranged from 11-25 cm. Minimum pod length (11.93 cm) was recorded for selection-5 followed by Gomati (15.27 cm) while maximum was recorded for Gadchiroli local-2 (25.60 cm). Similar results were reported by Muhammad *et al*.[8], who studied six different genotypes under medium rainfall conditions and reported significant variation for pod length among the genotype. That is the conformation of genotypic and environmental effect. Damarany tested 36 genotypes during summer and found significant variation for pod length. (fig-1 & Table 1 (b).

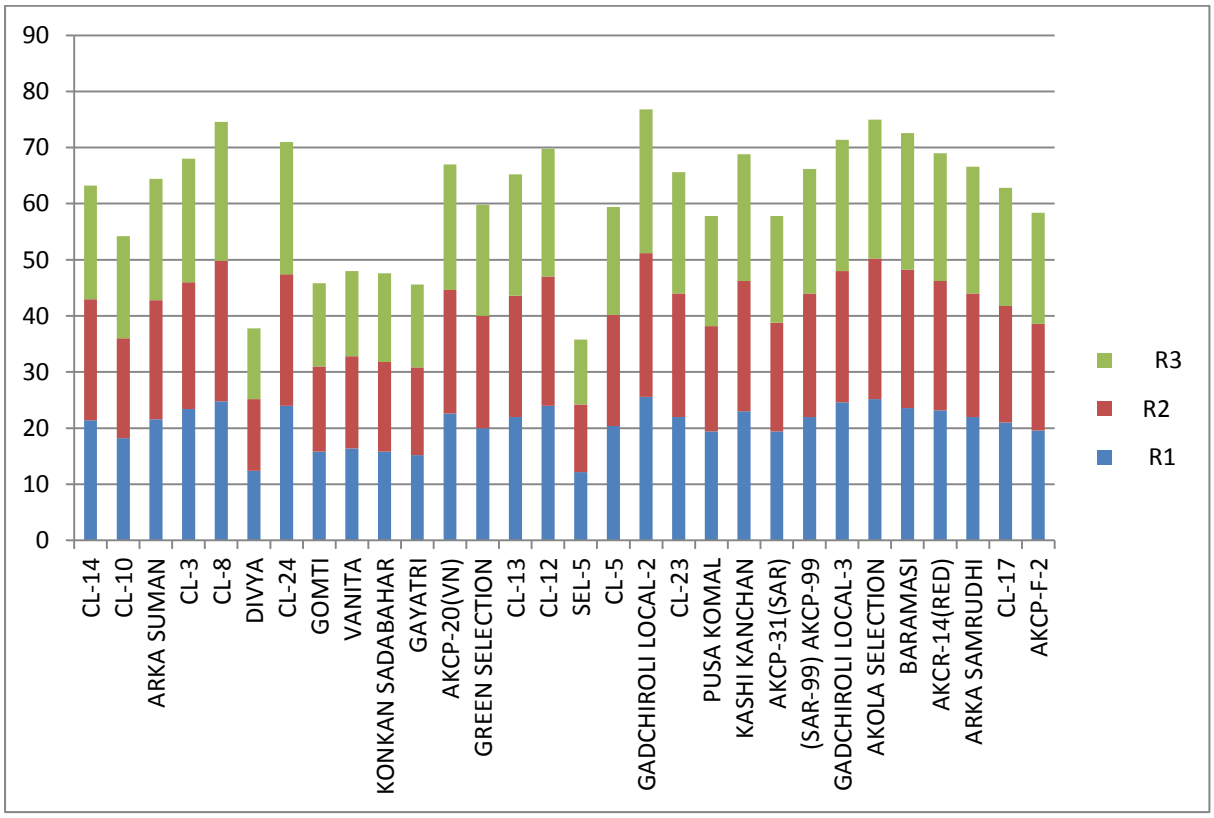

Fig. 1: Pod length genotypic and environmental effect

Highly significant variation for pod yield of the cowpea genotypes were studied. Pod yield ranged from 60.56 (q) ha-1 to 157.69 (g) ha-1 . Maximum yield of 157.69 (q) ha-1 was recorded for CL-14 followed by 138.05(q) ha-1 for Green selection, while the lowest yield of 60.56(q) ha-1 was recorded for genotype Vanita. The peculiarity of genotypes is of great importance when we evaluate/ develop genotypes for stability. However, variation in yield was noted, which may be attributed to climatic diversity and genetic makeup of the genotypes. Such variations in yield of different genotypes were also reported by Amanullah *et al*.[4], Muhammad *et al*.[8], Ram *et al*.[13]. They found significant differences in pod yield and showed positive relationship with seed pod-1, seed weight, plant height and pod length. Genotypes CL-14 may be used for further evaluation and adaptation study in the diverse pockets for Malakand Division to be released as commercial genotype.(fig-2)

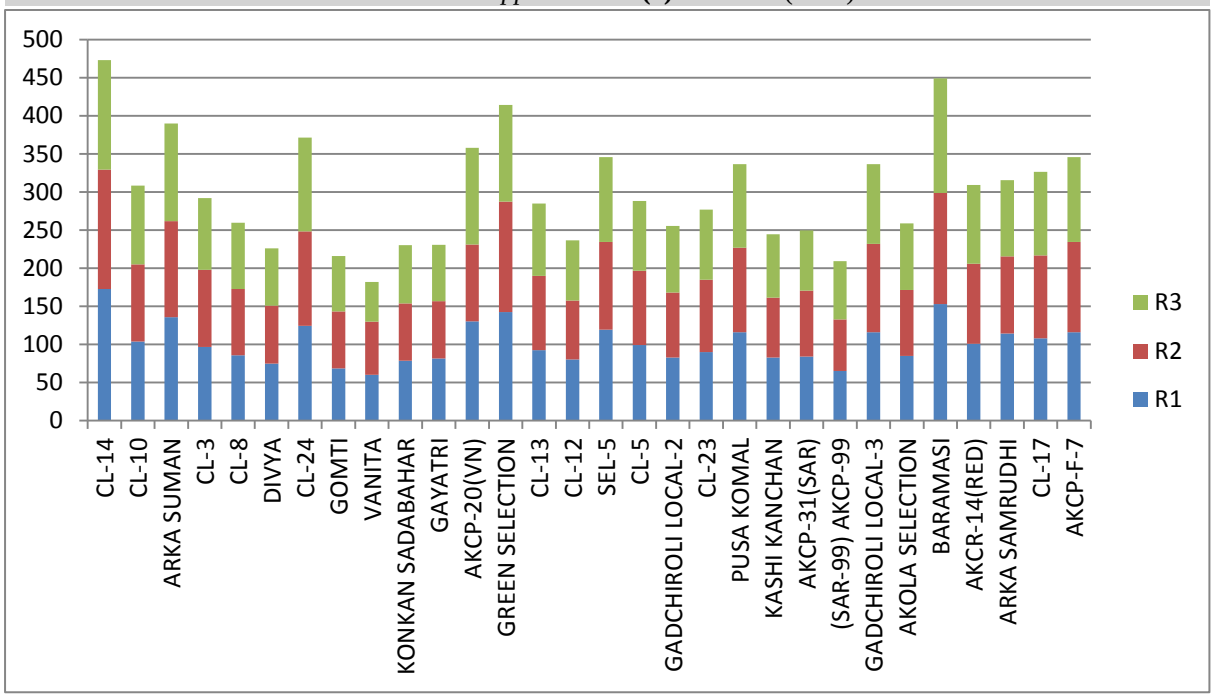

Fig. 2: Pod yield per hectare genotypic and environmental effect

Table 1 (a) : Estimation of mean of characters

Genotype	Plant height (cm)	Number of branches/ plant	Number of nodes on main branch	Days taken for first flowering	Days to 50% flowering	Number of cluster per plant	Number of green pods per cluster
T1- CL-14	29.93	17.07	13.80	56.00	62.45	18.3	3.53
T2 – CL-10	28.60	13.67	14.47	60.00	74.20	22.3	2.40
T3 – Arka Suman	60.07	24.75	24.40	53.40	57.93	20.9	2.87
T4 – CL-3	32.87	18.80	13.47	61.20	69.63	15.9	2.87
T5 - CL-8	31.20	18.60	15.40	66.20	69.60	16.4	2.73
T6 – Divya	27.47	12.27	16.00	44.33	48.60	18.2	2.73
T7 - CL-24	43.00	22.13	20.53	51.93	55.80	15.1	2.60
T8 – Gomati	35.87	8.59	13.53	41.73	44.80	17.0	2.67
T9 – Vanita	30.67	12.87	15.87	40.80	45.87	15.5	2.53
T10 – Konkan Sadabahar	27.33	19.53	14.67	44.53	50.33	15.2	2.53
T11 – Gayatri	29.87	9.40	16.67	42.20	46.33	15.6	2.67
T12 – AKCP -20 (VN)	38.47	21.66	18.13	49.73	54.07	19.7	3.53
T13 - Green selection	43.33	23.99	17.73	52.33	56.53	20.1	3.27
T14 – CL-13	35.33	16.73	15.20	53.33	57.73	18.2	2.80
T15 – C L-12	35.93	14.87	15.00	53.53	57.40	16.1	2.60
T16 – Selection-5	38.33	18.67	18.73	44.53	49.13	18.9	3.27

Continue…Table :1 (a)

T17 – CL-5	26.33	11.73	18.33	54.00	58.40	19.4	2.67
T18 – Gadchiroli local -2	49.00	25.47	19.87	45.60	50.20	14.1	2.73
T19 – CL-23	29.13	9.07	15.53	71.33	75.40	16.3	2.80
T20 – Pusa komal	38.13	20.00	21.40	58.87	63.33	19.3	2.80
T21 - Kashi Kanchan	31.64	9.80	12.73	63.17	68.13	15.9	2.73
T22 – AKCP- 31 (SAR)	28.27	10.67	14.13	53.80	65.07	19.5	2.73
T23 -AKCP-99 (SAR)	28.27	9.47	15.53	64.54	74.07	14.0	2.73
T24 - Gadchiroli local (RS)-3	51.33	25.98	10.73	45.64	50.87	21.7	2.93
T25 – Akola selection	70.40	25.70	21.67	51.20	55.27	15.5	2.67
T26 – Baramasi	35.93	23.07	11.53	51.27	55.47	20.3	3.13
T27- AKCR – 14 (Red)	30.33	9.20	16.47	52.87	57.47	19.4	3.20
T28 - Arka samrudhi	57.40	25.40	19.60	53.07	57.73	20.0	2.67
T29 – CL-17	43.93	23.07	18.73	62.73	67.07	19.2	2.80
T30 - AKCP- f – 7	36.80	18.47	17.80	42.00	46.47	19.2	2.87
SE (m)	**0.64869**	**0.43679**	**0.57186**	**0.48008**	**0.62838**	**0.20774**	**0.05462**
CD at 5%	**1.82834**	**1.23112**	**1.61182**	**1.35313**	**1.77111**	**0.58553**	**0.15395**

Table 1 (b): Estimation of mean of characters

Genotype	No. of pods per plant	Pod diameter (cm)	Pod length (cm)	100 seed weight	No. of seeds per pod	Average pod weight (g)	Pod yield per plot(kg)	Fiber content	Protein content
T1- CL-14	87.80	0.676	21.07	10.07	13.67	5.79	6.666	1.71	21.05
T2 – CL-10	54.13	0.709	18.07	11.01	9.07	5.18	4.169	1.55	18.28
T3 – Arka Suman	59.33	0.733	21.47	13.00	12.60	6.20	5.274	1.91	23.31
T4 – CL-3	46.27	0.670	22.67	12.44	15.87	5.64	3.949	1.66	19.08
T5 - CL-8	46.20	0.658	24.87	12.22	13.67	5.00	3.510	1.75	20.16
T6 – Divya	50.07	0.727	12.60	13.20	8.20	4.03	3.055	2.00	21.46
T7 - CL-24	39.40	0.756	23.67	17.07	17.87	8.55	5.025	1.09	19.48
T8 – Gomati	45.33	0.684	15.27	12.53	12.73	4.10	2.921	1.79	22.68
T9 – Vanita	39.67	0.725	16.00	12.17	12.47	4.11	2.459	1.85	19.54
T10 – Konkan Sadabahar	38.80	0.735	15.87	11.63	8.67	5.49	3.113	1.85	16.47
T11 – Gayatri	41.93	0.728	15.20	11.87	9.60	5.25	3.120	1.76	17.54
T12 – AKCP -20 (VN)	71.73	0.702	22.33	11.50	10.60	4.91	4.844	2.01	21.15
T13 - Green selection	66.07	0.775	19.93	12.17	11.80	5.83	5.605	1.82	22.31
T14 – CL-13	50.07	0.711	21.73	10.38	15.73	5.00	3.852	1.72	19.16
T15 – C L-12	42.13	0.723	23.27	11.18	16.33	5.41	3.201	1.80	18.25
T16 - Selection – 5	61.93	0.746	11.93	8.05	7.67	5.22	4.677	1.73	20.01
T17 – CL-5	52.20	0.701	19.80	10.70	15.60	5.14	3.899	1.59	18.45
T18 – Gadchiroli Local-2	39.07	0.807	25.60	11.20	15.47	5.73	3.457	1.65	15.88
T19 – CL-23	46.00	0.664	21.87	11.40	13.53	5.29	3.747	1.62	17.47
T20 – Pusa komal	54.20	0.651	19.27	11.23	13.33	5.79	4.552	1.67	22.38
T21 - Kashi Kanchan	43.67	0.643	22.93	12.67	10.60	5.12	3.310	1.92	21.32
T22 – AKCP- 31 (SAR)	53.60	0.677	19.27	8.13	11.47	4.25	3.375	1.34	19.97
T23 -AKCP-99 (SAR)	38.70	0.673	22.07	9.50	13.80	4.53	2.828	1.23	21.01
T24 - Gadchiroli local(RS) – 3	65.20	0.807	25.60	11.20	11.80	4.53	4.552	1.44	16.59
T25 – Akola selection	41.60	0.604	25.00	11.25	15.67	5.51	3.503	1.35	21.87
T26 – Baramasi	41.60	0.604	25.00	11.25	15.67	5.51	3.503	1.35	21.87
T27- AKCR – 14 (Red)	62.20	0.618	23.00	12.40	12.67	4.39	4.184	1.48	20.83
T28 - Arka samrudhi	51.53	0.673	22.20	13.23	13.13	6.01	4.266	1.87	23.80
T29 – CL-17	54.00	0.599	20.93	10.97	14.67	5.41	4.417	1.64	18.82
T30 - AKCP- f – 7	55.20	0.624	19.47	11.09	11.60	5.69	4.680	1.62	19.06
SE (m)	**1.23176**	**0.00855**	**0.21113**	**0.12291**	**0.1075**	**0.08865**	**0.14358**	**0.0274**	**0.25381**
CD at 5%	**3.47175**	**0.02409**	**0.59509**	**0.34642**	**0.30298**	**0.24986**	**0.40469**	**0.0772**	**0.71537**

CONCLUSION

This study of "performance of different cowpea varieties and genotypes Cowpea in semi-arid sub tropical condition of Vidharba region in terms of plant height, first flower 50% flowering, Number cluster per plant, Number of green pods per cluster, Number pods per plant, Pod length, Pod yield per hectare (q), Percentage of protein content. The results show that plant height, first flower, Number of pods per plant, pod lengh, pod yield per hectare (q) differed highly significantly in their performance when compared to the other observation especially 50% flowering, Number of cluster per plant, Number of green pods per cluster are significant values for all parameters assessed. PB-89, CL-14, Green selection had the highest yields over the others hence they are recommended to farmers in semi-arid sub tropical condition of Vidharba region for cultivation.

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