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Performance of Different Genotypes of Cowpea [*Vigna unguiculata* (L.) Walp.] in Malwa Plateau of Madhya Pradesh

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A B S T R A C T

An experiment was conducted at the Research Farm, Dept. of Horticulture, College of Agriculture, RVSKVV, Indore, M.P. during the year 2015-16. The experimental material was comprised of ten genotypes grown in Randomized Block Design with three replications, to record morphological, phonological, yield and its attributing traits. Cowpea genotype Sel.N-1 responded well in terms of growth, phenological, yield and quality parameters and suitable for commercial production in Malwa plateau.

Introduction

Cowpea (*Vigna unguiculata* L.) belongs to the family leguminoceae and having chromosome number 2n=22 with genus Vigna. It is originated from In India. It is grown in the states like Rajasthan and adjoining a part of Himachal Pradesh have a good acreage under this crop. It is grown widely throughout the year for all forms tender pods, dry seeds, fodder, green manure and cover crops both as sole and mixed crop. One of the reasons for low productivity of this crop is due to under rain fed and low input condition coupled with non-availability of high yielding genotypes. The crop also produces, excessive vegetative growth in heavy rainfall areas and under irrigated condition resulting in to poor yield. The physiological reason for productivity may be attributed to poor source-sink relationship, poor translocation efficiency at later stages of crop growth, shedding of floral parts and low harvesting index. Cowpea is one of the most important leguminous legume crop, fixed atmospheric nitrogen and improves the soil fertility. Cowpea have unique ability of biological nitrogen fixation, deep root system, mobilization of insoluble soil nutrient and bringing qualitative changes in soil. It increases nodulation, symbiotic nitrogen fixation, photosynthesis, early flower initiation as well as increasing the number of flowers and production of fresh pods. Cowpea fixes atmospheric N up to 77 kg/ha and leaves about

60-70 kg residual N for succeeding crops. Thus, cowpea is one of the most essential vegetable crops in organic farming systems as it contributes to the sustainability of cropping systems and soil fertility improvement even in marginal lands through provision of ground cover, plant residue, nitrogen fixation and suppressing weed. Besides plant nutrients, the presence of enzymes and hormones in manure provides to plants, essential for improvement of soil fertility and productivity. Cowpea requires good quantity of nutrients throughout the growth periods especially P for better development of roots, better nodulation and N-fixation.

Materials and Methods

The present experiment was laid out in the field of the Research Department of Horticulture Farm, College of Agriculture, Indore, during 2015- 2016. The land topography was almost uniform with an adequate surface drainage. The internal drainage of the experimental site is good. The experiment was laid out in Randomized Completely Block Design (RCBD) with three replications. Each replication consists of 10genotypes. All the genotypes were randomized separately in each replication.

After the layout of plan, prepared the 25 cm high hills to maintain row to row distance of 60 cm and plant to plant 15 cm. Sowing was done on September 03, 2015 by hand dibbling method. After sowing, the seeds were covered properly with soil by the use of rake, so that the seed may come in contact with the soil. After complete germination, gap filling was done to maintain desired plant population. When the re-sown seeds were germinated, thinning was done to maintain proper spacing and to facilitate the development of plants. All the observations related to growth & yield attributing traits of bitter gourd were recorded as per standard procedures from five randomly selected plants of each varieties in all the replications and their mean were worked out for statistical analysis (Panse and Sukhatme, 1989).

Results and Discussion

Result from table 1 clearly indicated that the genotype Sel.N-1 was recorded higher plant height (123.79cm), number of leaves per plant (53.70) and maximum number of branches per plant (11.25) which was significantly superior to other treatments. Whereas, the lowest plant height, number of leaves per plant and number of branches per plant were recorded under genotype Pusa Komal (78.83 cm, 46.80, and 8.83, respectively.). This increase in plant height might be due to application of major and minor nutrients, increased the photosynthetic activity, chlorophyll formation, nitrogen metabolism and auxin contents in the plants which ultimately improving the plant height. Similar results have been reported by Peksen (2004), Khan *et al.*, (2010), Basaran *et al.*, (2011). Probable reasons for enhanced more number of leaves, may be due to primitive effects of macro and micronutrients on vegetative growth which ultimately lead to more photosynthetic activities. These findings are in agreement with the findings of Abdogidi *et al.*, (2011) and Saravanan *et al.*, (2014).

Genotype R.Sel-2 was recorded the significantly maximum leaf area per Plant (11.32cm^2) while the minimum (8.91 cm^2) was noted under the genotype Pusa Komal. Leaf area was significantly increased by nitrogen, possibly because nitrogen helps in greater assimilation of food material by the plant which resulted in greater meristematic activities of cells and consequently the number of leaves, length and width of leaf in plant increasing. Similar results have been reported by Madukawe *et al.*, (2008). Significantly maximum nodes and inter node length (7.90cm) was recorded in variety Sel.N-1 as compared to other genotypes.

Table.1 Varietal cowpea performance for growth and phonological traits

Verity	Plant height (cm)	Number of leaves per plant	Maximum number of branches per plant	Leaf area per Plant (cm^2)	Maximum nodes and inter node length (cm)	Days to 50% flowering	Days to flower opening to pod picking
J.Sel.-1	118.86	52.6	9.43	81.63	7.26	44 9 2	49.64
R. Sel.-1	112.79	50.86	9.05	64.73	7.13	52.88	54.61
Sel.N-1	123.79	53.70	11.25	68.92	7.90	5 6. 7 8	58.65
R.Sel.-2	106.71	48.13	10.93	85.49	7.06	52.29	54.41
Sel.N-2	120.31	49.46	9.16	68.38	7.13	4 5. 6 3	48.31
CP-4	120.69	51.80	9.43	75.11	7.23	52.52	54.66
B-1	119.20	50.26	10.03	77.65	7.70	54.95	58.02
J.Sel.-2	118.84	52.76	10.60	72.14	6.40	53.63	55.99
Mradulla	121.47	53.23	10.66	71.90	7.50	54.92	57.30
Pusa Komal	78.83	46.80	8.83	62.40	7.53	53.12	55.60
SEm±	2.03	0.93	0.22	0.26	0.13	0.98	1.00
C.D. at 5% level	6.05	2.77	0.68	4.49	0.40	2.93	2.98

Table.2 Varietal cowpea performance of yield and its attributing traits

Verity	Number of green pods per plant	Number of seed per pod	Pod yield (q/ha)
J.Sel.-1	19.31	17.33	44.84
R. Sel.-1	17.37	13.33	54.96
Sel.N-1	22.11	19.33	102.30
R.Sel.-2	18.06	16.60	88.43
Sel.N-2	17.39	16.33	51.26
CP-4	16.09	15.66	62.26
B-1	19.10	18.66	94.24
J.Sel.-2	17.81	14.00	77.34
Mradulla	20.35	18.33	94.34
Pusa Komal	18.72	17.33	85.50
SEm±	0.54	0.89	1.14
C.D. at 5% level	1.64	2.66	3.40

The minimum nodes and inter node length (6.40 cm) was noted inJ.Sel.-2. It is concluded that the reason for is a nodes and inter node length genotype character may be increased due to the different rates of photosynthesis and photosynthates supply for maximum growth. These findings are in agreement with the results reported by Madukawe *et al.,* (2008).

Significantly days to 50% flowering (63.48) were recorded in genotypes Sel.N-1, the minimum (55.38) were observed in genotype J.Sel.-1. This may be due to increased supply of major plant nutrients and are required in larger quantities for growth and development of plants. Nitrogen accelerates the development of growth and reproductive phases and protein synthesis, thus promoting yield attributing characters. Similar results have been reported by Pandey (2006), Babaji *et al.,* (2011). Significantly maximum days to flower opening to pod picking were observed in genotype Sel.N-1. (58.65) while the minimum days of picking were recorded in Sel.N-2 (48.31). This trait is useful for obtaining higher return and can be utilized in the breeding programme. Similar results have been reported by Ibrahima *et al.,* (2013). Significantly maximum number

of green pods per plant (2 2.11) was recorded in Sel.N-1 while CP-4 was recorded minimum number of green pods per plant (16.09). The significantly maximum number of seed per pod (1 9.33) was recorded in the genotype Sel.N-1. while, genotype R.Sel.-1 was exhibited minimum number of seed per pod. (13.33). This may be due to increased supply of major plant nutrients and are required in larger quantities. The findings are in agreement with the findings of Khan *et al.*, (2010).

The yield of any crop is the final index of the experiment which indicates the success or failure of any treatment with this view the pod yield of cowpea was recorded. Significantly maximum yield was recorded in the genotype Sel.N-1 (102.30) and the minimum pod yield q/ha was recorded under genotype J.Sel.-1(44.84) (Table 2).

On the basis of research trial it can be concluded that under malwa region of Madhya Pradesh cow pea Cowpea genotype Sel.N-1 was found superior in terms of growth, yield and its attributing traits.

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