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PERFORMANCE OF COWPEA VARIETIES [*VIGNA UNGUICULATA* (L.) WALP] ON YIELD AND YIELD COMPONENTS IN ILORIN, KWARA STATE, NIGERIA

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ABSTRACT

Eleven early maturing cowpea genotypes were obtained from IITA, Ibadan and were arranged in a complete randomised design in three replications in the Biological garden, Department of Biological Sciences, University of Ilorin in 2008 and 2009 cropping seasons. Yield parameters such as number of pods per plant, length of pods per plant, number of seeds per pod, weight of pods per plant, 100 seed weight and yield per hectare were observed. Data collected were subjected to analysis of variance. The study demonstrated that varieties significantly influence cowpea yields and yield components. On average, IT 98K-131-2, IT 97K-499-35 and IT 95K-207-22 out performed the other varieties in the two cropping seasons. IT 98K-131-2 has the highest yield amongst cowpea varieties cultivated at Ilorin.

Keywords: Cowpea, Varieties, Performance, Yield components.

INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp) belongs to the family Leguminosae. It is one of the important food legume and a valuable component of the traditional cropping system in the semi and tropic covering Asia, Africa and Central America (Mortimore *et al.*, 1997). From the production of this crop, rural families variously derived food, animal feed and cash. In addition, because the seed is widely traded out in the major production area, it provides a cheap source of protein nutrition for relatively poor urban communities (Ologhbo and Fetuga, 1987). Despite the importance of cowpea in sustaining livelihood of the rural communities, seed yield of the crop has always remained low and variable. Poor production practices including the choice of variety and adaptability has contributed to cowpea productivity. There are diverse cowpea genotypes demanding a site specific directed management approach that include among others a selection of best adapted variety.

Researches on Cowpea production, improvement and utilization have been widely conducted in Nigeria as cowpea was regarded as a rural crop with no industrial use. The lack of high yield varieties, drought tolerance and resistance to pest and disease has relegated this nutritious pulse. Improved varieties of cowpea with resistance and tolerance to biotic and abiotic stresses can provide a powerful stimulus for rural development because they can enhance the productivity, quality and profitability as well as sustenance of farming systems with minimal input. Such varieties, especially benefit poor farmers that cannot afford inputs (Coetzee, 1990). Varietal requirement of cowpea in term of plant type, seed colour, maturity and usage pattern are extremely diverse from region to region. Yield potential of

cowpea is high averaging 1.5 – 3 t ha⁻¹ (Rosalind *et al.*, 2000). The fast growth and spreading habit of cowpea varieties suppress weeds and increased soil Nitrogen. This can be achieved through efficient selection of crop that can manipulate duration and reduction in severity of pests and diseases. Yield evaluation of some cowpea varieties has continued to generate interest among researchers in Nigeria (Ndo and Ndaeyo, 2001). Therefore, the aim of this study was to evaluate the yield characters of some selected cowpea genotypes.

MATERIALS AND METHODS

The experiments were conducted in the Biological Garden Department of Biological Sciences, University of Ilorin, during 2008 and 2009 growing seasons situated in the Southern Guinea Savannah with Lat. 8.30°N and Long. 4.33°E. In both experiments, a Complete Randomized Design (CRD) was used with three replications. Eleven varieties of cowpea were obtained from International Institute for Tropical Agriculture (IITA) Ibadan for evaluation. The plots were measured 2.5 x 1.2 metre consisting of 8 rows with a spacing of 20 cm within rows. Three seeds were planted per hole and later thinned to two per stand at two weeks after planting, weeding was done manually at four and eight weeks after planting while spraying was done at biweekly interval against insect pests at commencement of flowering and seed formation. The data were collected on number of pods per plant, pod length, number of seeds per pod, weight of pods per plant, 100 seed weight/plant and yield kg ha⁻¹. The data were subjected to analysis of variance (ANOVA) using the Statistical Analysis System (SAS) 2003. The mean were separated using the Least Significant Difference (LSD) at P ≤ 0.05.



RESULTS AND DISCUSSION

Table 1 shows the physico-chemical properties of the experimental area. The soil pH showed that the soil was slightly acidic, however the organic carbon was found to be low which had 0.45% with low available nitrogen of 0.53% and available phosphorus is also low (4.60 ppm). The soil was characterized as sandy loam. The research results in this area of study have shown the importance of the improvement of the soil fertility for crop production (Bationo and Mokwunye, 1991; Sedogo 1993). Table 2 shows the effect of genotypes differences on pod number, length of pod per plant and number of seeds per pod and the combined mean for 2008 and 2009. The result revealed that a significant ($P \leq 0.05$) difference in pod number, pod length and number of seeds per pod throughout the years and the combine means except number of pods per plant and number of seeds per pod in 2008. The result showed the number of pods per plant ranged 12 pods in IT98K-962 to 43 pods in IT98K-131-2. There was significant difference in length of pod per plant which ranged from 8.2 cm to 15.8 cm in IT97-461-4 and IT98K-131-2 respectively. The number of seeds was significantly higher with IT98K-131-2 (15) and also significantly lower in IT97-461-4 that produced six seeds per pod. The result showed that there are more pods per plant, increased

pod length as well as number of seeds per pod; this is translated to increased yield. These could attribute to genetic make up of the genotypes which might have the ability mobilized assimilate and the influenced by environmental factors that resulted to higher pod production. This result corroborates the findings of Grema *et al.* (1995) and IITA (1998) who found that no single variety of cowpea can be suitable for all conditions. The mean pod weight, 100 seed weight and seed yield per ha⁻¹ are presented in Table 3. There were significant difference in yield components and yield ($P=0.05$). The result showed in genotypes which ranged from 11.0 to 46.1 grams for weight of pods per plant. Also the 100 seeds weight was significant ($P=0.05$) Higher weights was recorded 21.3g in IT95K-207-22 while the lowest 100 seeds weight was recorded 12.9 in genotype IT98-428-3 where the mean significant difference was observed due to genotypes effect. The differences observed in 100 seed weight could be attributed to the seed size and ability of the genotypes to transport assimilates to the seed though not determined in this study. This was also suggested by Razaq (1995) who observed that genotypes differed significantly in the number of seeds per pod. Likewise, Ahmad *et al.* (2001) observed that the genotypic makeup influence number of seeds per pod and yield.

Table 1: Physical-chemical characteristics of the soil

Parameter	Value
pH in water	6.74
Organic carbon (%)	0.45
Available Nitrogen (%)	0.53
Available Phosphorus (PPM)	4.60
Available Calcium (Meq/100g)	3.67
Available Sodium (Meq/100g)	0.38
Available Potassium (Meq/100g)	0.53
Particle size analysis	
Silt (%)	3.17
Sand (%)	53.70
Clay (%)	40.30
Textural class	Sandy loam

Table 2: Number of pods per plant, Length of pod per plant and number of seeds per pod

Varieties	Number of pods Per Plant			Length of pod per Plant (cm)			Number of Seeds per pod		
	2008	2009	Mean	2008	2009	Mean	2008	2009	Mean
IT99K-316-2	25	31	28	7.0	14.9	11.0	10.6	12.0	11.0
IT00K-96-5	25	31	28	8.0	13.3	10.7	9.0	14.0	12.0
IT98-428-3	15	27	21	10.0	13.3	11.7	11.0	11.0	11.0
IT98K-131-2	40	43	41.5	11.5	15.8	13.7	15.0	15.0	15.0
IT97-461-4	20	22	21	8.2	12.5	10.4	5.0	6.0	6.0
IT98K-205-8	15	15	15	11.5	8.9	10.2	11.0	11.0	11.0
IT97K-499-35	26	30	28	11.0	10.6	10.8	12.0	8.0	10.0
IT960-610	20	25	23	12.2	12.6	12.4	11.3	13.0	12.0
IT95K-207-22	25	32	29	13.3	13.0	13.5	7	12.0	9.5
IT98K-560-1	23	28	26	11.3	16.4	14.0	6.0	12.5	9.0
IT98K-962	12	12	12	9.4	11.3	10.4	7.0	9.0	8.0
Mean	22.4	26.9	25	10.3	12.9	11.8	9.6	11.2	10.4
CV (%)	12.3	3.6	4.2	6.3	2.9	4.3	14.5	3.8	9.2
LSD (0.05)	1.3	1.5	1.7	0.8	0.2	0.5	2.5	0.5	1.5
Significance	NS	*	*	**	*	*	NS	*	*

** = Significant at 0.01 * = Significant at 0.05 level of probability NS = not significant

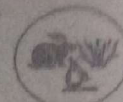


Table 3: Weight of pod per plant, 100 seeds weight and seed yield per ha¹

Varieties	Weight of pod per plant			100 seeds weight (g)			Seed yield kg ha ¹		
	2008	2009	Mean	2008	2009	Mean	2008	2009	Mean
IT99K-316-2	33.8	36.0	34.9	12.8	16.9	14.5	419.5	571.8	495.7
IT00K-96-5	41.3	49.3	45.3	13.0	17.4	15.2	414.4	450.6	432.5
IT98-428-3	13.4	19.3	16.4	11.6	14.2	12.5	548.4	309.3	428.9
IT98K-131-2	36.9	38.9	37.9	18.1	17.8	18.0	518.4	681.1	629.8
IT97-461-4	18.4	25.5	22.0	18.1	22.2	19.2	391.2	408.0	399.6
IT98K-205-8	11.0	11.0	11.0	9.3	16.7	13.0	176.0	176.0	176.0
IT97K-499-35	38.6	43.6	41.1	11.7	17.1	14.4	391.2	622.1	506.8
IT960-610	27.1	27.1	27.1	13.8	14.2	14.0	386.7	433.6	407.1
IT95K-207-22	36.1	36.1	36.1	20.5	22.0	21.3	450.1	557.1	503.9
IT98K-560-1	42.9	49.0	46.1	17.3	19.0	18.2	568.2	610.2	582.0
IT98K-962	19.0	19.0	19.0	14.8	17.1	16.0	300.4	304.0	302.0
Mean	28	32.3	30.8	13.9	17.6	16.1	403.9	464.1	434
CV (%)	22.3	3.6	8.9	11.4	4.4	4.9	22.4	211	21.8
LSD (0.05)	0.5	2.0	2.4	8.9	0.4	0.8	133.8	158	146
Significance	*	*	*	**	*	*	*	*	NS

** = Significant at 0.01 * = Significant at 0.05 level of probability NS = not significant

CONCLUSION

In the present study, cowpea lines showed inconsistencies in yield components and seed yield. The study demonstrated that varieties significantly influence cowpea yields and yield components. The early maturing varieties performed very well in the

southern guinea savannah. On the average, IT98K-131-2, IT97K-499-35 and IT95K-207-22 out performed the other varieties in the two seasons. IT98K-131-2 was found to be the best as the highest yielding while IT98K-205-8 had the lowest yield in Ilorin metropolis..

REFERENCES

- Ahmad, J., Choudhery, M.H., Salah-ud-Din, S. and Ali, M.A. (2001): Stability for grain yield in wheat. *Pakistan Journal of Botany* 28: 61-65.
- Bationo, A. and Mokwunye, A.U. (1991): Alleviating soil fertility constraints to increased crop production in West Africa. The experience in the Sahel. *Fertilizer Research* 29: 95-115.
- Coetzee, J.J. (1990): Cultural practices for cowpea. Farming in South Africa. Leaflet. AL. Directorate: Agricultural Information, Pretoria.
- Grema, A.K., Mohammed, I. and Mshelia, I. (1995): Research highlights of the 1995 Collaborative Research Projection. North East Arid Zone Development Programme (NEAZDP) Gashua, Yobe State, Nigeria.
- IITA (1998): *Cowpea Production and Utilization*. In: *IITA Crops and Farming System*. In: <http://www.iita.orc/cowpea.htm>.
- Mortimore, M., B.B Singh, F. Haris and Blade, S.F. (1997): *Cowpea in traditional cropping Systems*. In: *Cowpea Research* B.B. Singh, Mola Roy, D. R. Pashiel, and Jackai L.E.N.(eds). International Agriculture and Japan International Research Centre for Agricultural Science, Ibadan, Nigeria
- Ndon, B.A. and Ndaeyo, N.U. (2001): Evaluation of Some Cowpea (*Vigna unguiculata* (L.) Walp) Cultivars Adaptable to Acid Soils of Uyo, South Eastern, Nigeria. *Global Journal of Pure and Applied Sciences* 7(3):437-441.
- Ologhbo, A. D. and Fetuga, B.L. (1987): Energy Value in Differently Processed Cowpea *Nigerian Food Journal* 5:18-23.
- Razaq, M. (1995): *Effects of sowing date on growth and yield of four mungbean (Vigna radiata) varieties*. M.Sc dissertation, Department of Agronomy University of Agriculture, Faisalabad.
- Rosalind, A., Ball, L., Purcell, C. and Earth, D.V. (2000): *Crop Science* 40:1072 -1077.
- SAS Institute (2003): SAS/STAT 9.0 edition. SAS Inst, Cary, NC.
- Sedogo, M.P. (1993): *Evolution des sols ferrugineux lessivés sous culture: influence des modes de gestion sur la fertilité*. Thèse de Doctorat Es-Sciences, Abidjan, Université Nationale de Côte d'Ivoire.