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PRELIMINARY EVALUATION OF YIELD AND YIELD PARAMETERS IN SOME COWPEA CULTIVARS FOR ADAPTABILITY TO LAFIA CLIMATIC CONDITION IN NIGERIA

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ABSTRACT

Eight cultivars of cowpea (*Vigna unguiculata*) were collected from IITA (International Institute of Tropical Agriculture), four cultivars from University of Agriculture Markudi and 2 varieties were obtained from Nasarawa State Agricultural Development Programme (NADP) which one of it served as the control. The cowpeas were characterized and evaluated for yield and yield parameters at the College of Agriculture Research farm. A randomized complete block design (RCBD) with four replications was used. The aim of this study was to evaluate the performance of the cultivars in Lafia climatic condition and to select among the cultivars, most suitable one and to make entries on its yield parameters. The result showed that the cultivars were significantly different from each other at $p<0.05$ and also from the control variety for mean number of pods per plant, (MPP), mean number of seeds per pods (MSPH), mean number of seeds per plant at harvest ($MSPH_o$) and mean pod length (MPLH). There was no significant difference between the cultivars and the control variety for mean number of days to flowering (MDF) and mean number of days to maturity. Cultivar IT06K-135, IT06K-281-1, IT07K-299-4 and IT06K-270 had a higher seed 100 g weight than the commonly cultivated variety IITA 288 and IITA 277.

INTRODUCTION

Cowpea is cultivated on at least 12.5 source million hectares, (Sigh *et al.,* 1997) with an annual production of over 3 million tones. It is widely distributed throughout the tropics but Central Africa and West Africa accounts for over 64% of the area under cultivation (Singh *et al.,* 1997). The crop is of major importance to the livelihoods of millions of people in the tropics. For resource-poor small-holder farmers, the crop serves as food, animal feed, cash and manure because of its high protein content. It can be regarded as a pivot of sustainable farming in regions characterized by systems of farming that make limited use of purchased inputs like inorganic fertilizer. The crop can fix about 240kg ha^{-1} of atmospheric nitrogen and make available about 60-70Kg/ha nitrogen for succeeding crops grown in rotation with it (Crop Research Institute (CRI) 2006); Aikins and Afuakwa, 2008). Traditionally, the production centre of this crop is in guinea and Sudan Savannah ecologies. Lack of knowledge of good cultural practices, use of local varieties which are generally low yielding coupled with low soil fertility and weed management problem are some of the constrains limiting the production of cowpea in Nigeria, (Joseph *et al* 2014). The development of high yielding cowpea genotypes by research institutes is highly desirable to encourage farmers to shift toward monoculture system, since they grow cowpea mostly as cash crop (Singh, 1997 and 1998). Farmers are also known to rely on podded cowpea as source of food particularly during time of food scarcity which coincides with the peak period of the production period. These evaluations would indicate adaptable cultivars and expand the crops production area and provide more food and income for the populace (Ndon and Ndaeyo 2001). Yield evaluations usually involve the consideration of other characters that determine the overall performance of the genotypes. This is necessary, because yield is a quantitative character and therefore influenced by a number of traits acting singly or interacting with each other. Agronomic traits of cowpea that contribute to seed yield includes earliness (number of days to flowering, pod filling period and number of days to

physiological maturity), number of branches per plant, number of pods per plant, pod length, number of seeds per pod and 100 seed weight (Babalola, 1989; Leleji, 1981; Ogunbodede, 1989; Okeleye *et al.*, 1999). Thus these traits and their inter-relationships are important factors to consider when the aim is to increase seed yield in cowpea.

MATERIALS AND METHODS

The study was carried out at the College of Agricultural Research farm, College of Agriculture Lafia, Nasarawa State. Some of the cultivars were collected from International Institute of Tropical Agriculture, Kano (IITA) substation and the Federal University of Agriculture Markudi, Benue State. Two local varieties used as controls were obtained from Nasarawa State Agricultural Development Programme and one of it is used as control. The cultivars evaluated include IT07K-304-9, IT06K-270, IT97K-499-35, UAM IID -55-6, UAM IID -7-1, IT99K-391, IT98K-573-1-1, IT06K-281-1, IT06K-121, IT06K-135, IT07K-187-55 and IT98K-391, ITA 277 and ITA 288 which serves as the control. A randomized complete block design (RCBD) with four replications was used. Seeds were planted at inter and intra-row spacing of 30cm and 50cm, respectively. Six rows of the appropriate genotype were planted 50 x 25cm. one unplanted space (row 0.5m) was used a discard row between treatments and a ridge between replication. Two seeds were sown per hill and later thinned to one plat per hill at two weeks after seedling emergence giving a plant population of 80,000 plants/ha. Weeding was done while spraying against insect pest was done once at the onset of bud formation using paraforce.

Records were taken from 4 plants randomly chosen from the two central rows of each plot. Data collected were number of days to flowering, number of days to maturity, number of pod per plant, number of seed per pod at harvest, number of seed per plant, 100 seed weight at harvest, number of day to pod filling period and pod length. The data were analysed using Analysis of variance (ANOVA)

and Least Significant Difference (LSD) was used to separate the means. The result is represented in the table below.

RESULTS AND DISCUSSION

The results of the performance of the 12 cultivars and the two varieties are presented in table 1. From these results, there was positive adaptability response among some of the cultivars for the traits studied. The yield parameters investigated during the period of study were to estimate the variations in all the fourteen cowpeas (cultivars and varieties collected). The cultivars and varieties differed significantly from one another at ($p<0.05$) with respect to the number of pods per plant, number of seeds per pods, number of seed per plant at harvest and mean pod length. With respect to mean number of days to maturity UAM IID-55-6 recorded the lowest while IT07K-187-55 recorded the highest mean number of days to maturity and these differ statistically at $P<0.05$ and also between UAM IID-55-6 and other cultivars and varieties. mean number of pod per plant, IT06K-281-1 was observed to record highest which is significantly different from IT06K-121 which had the lowest mean number of pod per plant, IT06K-281-1 and IT06K-121 also differs significantly from ITA 277, IT07K-304-9, IT06K-270, IT97K-499-35, UAM IID-55-6, UAM IID-7-1, IT98K-391, IT98K-573-1-1. Although IT06K-121 did not differ from the local variety ITA 288 for mean number of pod per plants. For mean seed per pod at harvest, ITA 277 (the control) recorded the highest followed by IT97K-499-35 and IT07K-304-9 and this was significantly different from the lowest recorded in IT06K-121, IT06K-270, IT07K-299-4, IT07K-187-55, IT98K-573-1-1. The mean number of seed per plant at harvest was highest in IT98K-391, UAM IID-55-6, IT07K-187-55 and IT07K-299-4 and these were significantly different from each other and are also significantly different from the lowest recorded in ITA 288, IT06K-121 and IT97K-499-35. For 100 seed weight at harvest, the highest was recorded in IT06K-135 followed by IT06K-281-1 and they were not significantly different from each other but were significantly

different from the other cultivars. IT07K-304-9 recorded lowest in term of seed weight at harvest, and this is also significantly different from others at $p<0.05$. The mean pod lengths at harvest were highest in IT097K-499-35 and ITA 277 followed by IT07K-299-4 and IT07K-304-9. IT97K-499-35 and ITA 277 and were not significantly different from each other but are significantly different from the other cultivars. The lowest mean pod length was recorded in IT06K-135 and this is not significantly different from IT98K-391. From the yield parameters investigated, it was observed that those cultivars and varieties which had more seed per pod at harvest like ITA 277, IT97K-499-35, IT07K-304-9 and had longer pod length at harvest produced less seed per plant except for ITA 288 and IT07K-299-4 which had 15.46cm and 15.58cm mean pod length but produced 12.18 and 11.14 mean seed per pod at harvest, IT07K-299-4 also produced an appreciable quantity of mean number of seeds per plant at harvest (316.11). While those cultivars which had shorter pod had more pod and consequently more number of seeds per plant (higher yield).

IT98K-391 which had more mean number of seeds per plant at harvest weighed less (100 seed weight) at harvest (9.98 g) not as much as weight observed in IT06K-135 and these two varieties are significantly different from each other at ($p<0.05$). This could be due to the sizes of seeds produce by the cultivar or as a result of the sink and source relationship. This simply implies that the source was being utilized in the formation of seeds number than weight. It is possible too that the low seed population gave room for assimilation of higher nutrients from the sink and source thus giving the cultivars this advantage. Most of the cultivars produced more mean numbers of pods, and 100 seed weight than the control as observed in UAM IID-55-6, UAM IID-7-1, IT98K-391, and IT06K-281-1. IT06K-281-1 recorded superiority in mean number of days to flowering, pod per plant, and it was also significantly better than the control variety for seed weight, mean number of days to pod filling and not significantly different from control in terms of mean

number of seed plant and pod length. UAM IID-55-6, UAM IID-7-1, IT98K-391 and IT06K-281-1 are promising and merit further evaluation preparatory for nomination as candidate for official release.

REFERENCES

Aikins, S. H. M., & Afuakwa, J. J. (2008). Growth and dry matter yield responses of cowpea to different sowing depths. ARPN Journal of Agricultural and Biological Science, 3(5-6), 50-54.

Babalola, O. (1993). Growth and Development of three varieties of cowpea in Western Nigeria Yield and dry matter production. Tropical Grain legume Bull. 20; 3-5.

Crop Research Institute. (2006). Cowpea production guide: Introduction to cowpea production. Retrieved from http://www.cropsresearch. Org/publications/pdf/cowpea Introduction.pdf.

Joseph, A. Osiptan, A.O, Segun,T.L, Adeyemi, R.O, and Afolami, S.O, (2014). Growth and yield performance of cowpea (*Vigna unguiculata* (L) walp) as influenced by Row-spacing and period of weed interfence in south-west Nigeria. Journal of Agricultural Science.

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 Jour. of Pure and Applied Sciences 7(3): 437-441.

Ogunbodede, B.A. (1989). Comparisons between three methods of determine the relationships between yield and eight of its components in cowpea (*Vigna unguiculata* (L) walp). Scientia Horticultures 42:219-224.

Okeleye,K, Ariyo, O.J and Olowe, V.I. (1991). Evaluation of early and medium duration cowpea (*Vigna unguiculata* (L) Walp) cultivars for agronomic traits and grain yield. Niger Agric. J. 30:1-11.

Singh BB, Mohan Raj DR, Dashiell KE, Jackai LEN (1997). Advances in cowpea research International Institute of Agriculture (IITA) and Japan International Research Center for Agricultural Sciences (JIRCAS), IITA, Ibadan, Nigeria.

References to this paper should be made as follows Hauwa Ahmad Kana (2017), Preliminary Evaluation of Yield and Yield Parameters in Some Cowpea Cultivars for Adaptability to Lafia Climatic Condition in Nigeria. *J. of Agriculture and Veterinary Sciences,* Vol. 9, No. 3, Pp. 15-21