



PERFORMANCE OF COWPEA (*Vigna unguiculata* L.) VARIETIES GROWN IN MAIDUGURI SUDAN SAVANNA, NIGERIA

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Abstract

A field experiment was conducted during the 2024 rainy season at two locations:

Teaching and Research Farm, University of Maiduguri (latitude 11.47°N, longitude 12°E) and Teaching and Research Farm, Borno State University (latitude 11.83°N, longitude 12.99°N and altitude 16.464°E)

Keywords: Growth, Cowpea, Varieties, Savanna and Yield

INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp), commonly referred to as “beans” in Nigeria, is a legume of vital importance to the livelihoods of millions of people in West and Central Africa. It serves as a highly nutritious and affordable source of protein for both rural and urban consumer (Timko *et al.*, 2021). In Nigeria, cowpea is reported to contribute significantly to daily protein intake, particularly in low-income households (Olayiwola *et al.*, 2018). Beyond its nutritional value, cowpea haulms are widely used as livestock fodder, making it a key crop in integrated crop-livestock farming systems, where both grain and fodder are harvested from the same crop (Boukar *et*

315m above sea level), in the Sudan Savanna region of Nigeria. The study aimed to evaluate the performance of cowpea varieties. The experiment was laid out in a Randomized Completely Block Design (RCBD) with three replications. The treatment consisted of four cowpea varieties: Fuampea 1, Fuampea 4, Sampea 14, and Sampea 20-T. The parameters assessed included plant height per plant, number of leaves, number of branches, days to 50% flowering, 100 grain weight, and yield per hectare. Data collected were analyzed using analysis of variance (ANOVA) with Statistix version 10.0, and mean comparisons were conducted using the Least Significant Differences (LSD) and Duncan Multiple Range Test (DMRT) at 5% probability level. The findings revealed that Fuampea 1 and Fuampea 4 performed superior plant height, number of leaves, and number of branches, whereas Sampea 20-T had the lowest values among the varieties. Additionally, Fuampea 4 took longer days to reach 50% flowering. Yield related parameters were significantly higher for varieties Fuampea 4 and Fuampea 1 in both locations and the combined. Therefore, it was concluded that cultivating either Fuampea 4 or Fuampea 1 would enhance sesame productivity and optimize yield.

*a*l., 2016). West and Central Africa account for over 80% of global cowpea cultivation, with Nigeria alone being the world's largest producer and consumer (Egbadzor *et al.*, 2020). In Nigeria, cowpea is predominantly cultivated in the northern regions, characterized by savanna vegetation and moderate to low rainfall (IITA, 2022).

Cowpea production in Nigeria has shown significant growth over the decades, largely due to increased awareness and adoption of improved varieties. From the early 1960s to recent years, both the area under cultivation and average yields have improved markedly (FAO, 2021). However, yields still remain below potential, with averages in some areas like northern Nigeria ranging from 300 to 500 kg/ha due to persistent constraints such as pests, diseases, and erratic rainfall (Kamara *et al.*, 2019; Amusan *et al.*, 2023). In Borno State, for instance, unreliable and poorly distributed rainfall poses a major challenge to optimal cowpea production (Balarabe *et al.*, 2021). As the population grows and food demand increases, the development and dissemination of high yielding, pest-resistant, and drought-tolerant cowpea varieties remain

essential for sustainable production and food security in Nigeria and the broader Sahelian region.

MATERIALS AND METHODS

The study was conducted during 2024 rainy season at the Teaching and Research Farm, Faculty of Agriculture, University of Maiduguri, Borno State (Latitude 11.47°N, Longitude 12°, 16.464°E and an altitude of 345 m above sea level) and Teaching and Research Farm, Borno State University (Latitude 11.83°N and Longitude 12.99°N and altitude 315 m above sea level), in the northern fringes of the Sudan savanna belt of Nigeria. Four varieties of sesame obtained from the International Institute of Tropical Agriculture (IITA), Sub-station Kano, Nigeria, The experiment was laid out in a randomized complete block design (RCBD) with three replicate, and each plot measured 4m² plot, with 0.5m within plots and 1m between blocks. Each contained four plots, resulting total of 12 plots for the study. With spacing of 75 x 50cm was adopted for the trial. Agronomic practice such as weeding was done manually at 3 and 6 weeks after planting to ensure weed free plots, all the data were collected within the net plot where 5 plants were tagged. The parameters recorded were plant height per plant, number of leaves per plant, number of branches per plant, days to 50% flowering, 100 grain weight and grain yield per hectare was recorded. All data collected were subjected to analysis of variance (ANOVA). Means were separated using Duncan's Multiple Range Test (DMRT) and Least Significant Difference (LSD) at 5% level of probability.

Effect of cowpea varieties on plant height

Table 1 indicated effect of cowpea varieties on plant height of cowpea at Unimaid, Bosu and the combined. Results showed no significant effect of cowpea varieties at 3 and 6 WAS at Unimaid. At 9 WAS, Fuampea 1 and Fuampea 4 significantly produced taller plants. Sampea 14 and Sampea 20-T produced shorter plants. At Bosu, Result showed no significant effect at 3 and 6 WAS. At 9 WAS, Fuampea 1 significantly produced taller plants compared to the other varieties while Sampea 14 produced shorter plants. For the combined, Result indicated no significant at 3 and 6 WAS. At 9 WAS Fuampea 1 and Sampea 14 significantly produced taller plants, while the shorter recorded with Sampea 20-T.

Effect of sesame varieties on number of leaves

Table 2 presents results on the effect of cowpea varieties on number of leaves at Unimaid, Bosu and the combined. Results showed there was no significant effect of cowpea varieties on the number of leaves at 3 WAS. Fuampea 1 significantly produced a higher number of leaves compared to other varieties at 6 and 9 WAS at Unimaid location. At Bosu, there was no significant effect at 3 WAS. Fuampea 1 significantly produced a higher number of leaves, while Sampea 14 and Sampea 20-T significantly produced a lower number of leaves at 6 WAS. At 9 WAS. For the combined, there was no significant effect of cowpea varieties at 3 WAS. Fuampea 1 significantly produced higher number of leaves, while Sampea 20-T and Sampea 14 significantly produced lower number of leaves at 6 and 9 WAS.

Effect of sesame varieties on number of branches and days to 50% flowering

Table 3. Present effect of cowpea varieties on the number of branches and days to 50% flowering. Results showed that Fuampea 4 significantly produced a higher number of branches compared to Sampea 20-T, while Sampea 14 significantly produced lower number of branches at 3, 6 and 9 WAS in both locations and the combined. The effect of cowpea varieties on days to 50% flowering are indicated in Table 3. Results showed that there is a significant effect of cowpea variety on days to 50% flowering in both locations and the combined. Fuampea 4 had longer days to attain 50% flowering compared to Sampea 20-T. Fuampea 1 significantly took fewer days to flowering compared to other varieties at both locations and the combined.

Effect of Sesame Varieties on 100 Grain Weight and Grain Yield per hectare

The effect of cowpea varieties on 100 grain weight of cowpea are showed in Table 4. Results show that Fuampea 4 and Fuampea 1 significantly produced heavier grain weight compared to other varieties. Sampea 14 significantly produced lower grain weight at both locations and the combined. The effect of cowpea varieties on the grain yield of cowpea are indicated in Table 4. Results indicated there was significant effect of cowpea variety on grain yield. Fuampea 4 significantly produced higher grain yield. This did not differ significantly from Fuampea 1 and Sampea 20-T. Sampea 14 significantly

produced lower yield compared to the other varieties at both locations and the combined.

DISCUSSION

Effect of Cowpea Varieties on Growth and Yield Component of Cowpea

The results reveal that the Fuampea 1 cowpea variety produced significantly taller plants and a greater number of leaves per plant, a trait likely linked to its genetic composition. This finding is in agreement with Sani *et al.* (2019), who reported that improved cowpea varieties like IT89KD-391 had greater plant height than local varieties. The higher number of leaves in Fuampea 1 likely enhances its photosynthetic capacity, thereby supporting stronger growth and improved performance. In contrast, Fuampea 4 demonstrate a significantly higher number of branches per plant and showed delayed flowering, as indicated by the longer time taken to reach 50% flowering. This supports the findings of Yakubu *et al.* (2010), who noted that cowpea genotypes with vigorous vegetative traits often form more branches and exhibit prolonged vegetative stages. Similarly, Omoigui *et al.* (2007) found that late-flowering genotypes had more energy into vegetative development during early growth, resulting in increased branching. According to Aliyu and Makinde (2016), such late-flowering varieties often balance reproductive timing with enhanced vegetative growth, leading to a greater number of leaves and branches. This suggests that Fuampea 4 growth pattern may be genetically inclined toward extended vegetative development, which could be beneficial in regions with longer cropping seasons where late-maturing varieties are advantageous.

Both Fuampea 1 and Fuampea 4 produced heavier 100 grain weights and yielded more than other tested varieties. These differences in yield and grain weight are primarily due to their genetic characteristics, which influence growth dynamics and nutrient distribution during reproduction (Adebayo *et al.*, 2019). The larger seeds from Fuampea 4 not only increase its market value but also enhance nutritional quality, as larger grains often contain more protein (Omoigui *et al.*, 2020).

CONCLUSION

In the context of this study, it can be concluded that the 530-6-1 or Type 4 varieties was appropriate for higher productivity of sesame, leading to optimum yield.

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Table 1: Performance of cowpea varieties on plant height at 3, 6 and 9WAS at Unimaid, Bosu and the combined during 2024 raining season.

Treatment	UNIMAID			BOSU			COMBINED		
	3	6	9	3	6	9	3	6	9
FUAMPEA 1	13.22 ^a	27.24 ^a	41.08 ^a	11.82 ^a	24.78 ^{ab}	40.79 ^a	12.52 ^a	28.01 ^{ab}	40.94 ^a
FUAMPEA 4	12.65 ^a	28.67 ^a	40.59 ^a	10.39 ^b	27.33 ^a	35.58 ^b	11.53 ^{ab}	26.00 ^a	38.08 ^b
SAMPEA 14	11.27 ^a	29.47 ^a	37.74 ^b	11.54 ^{ab}	25.02 ^{ab}	29.09 ^{bc}	11.40 ^{ab}	27.25 ^{ab}	39.42 ^a
SAMPEA 20-T	11.36 ^a	25.91 ^a	31.28 ^b	10.23 ^b	23.69 ^b	38.42 ^{ab}	10.79 ^b	24.80 ^b	34.85 ^{bc}
SE(±)	0.751	1.941	2.422	0.679	1.591	2.449	0.564	1.487	2.003

Mean follows by the same letter(s) in a column are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level of probability.

Table 2: Performance of cowpea varieties on number of leaves at 3, 6 and 9 WAS at Unimaid, Bosu and the combined during 2024 raining season.

Treatment	UNIMAID			BOSU			COMBINED		
	3	6	9	3	6	9	3	6	9
Cowpea variety (CV)									
FUAMPEA 1	10.77 ^a	23.87 ^a	39.61 ^a	11.82 ^a	25.26 ^a	40.75 ^a	11.29 ^a	24.57 ^a	40.17 ^a
FUAMPEA 4	10.32 ^a	19.66 ^b	34.05 ^{ab}	11.25 ^a	20.57 ^b	35.05 ^{ab}	10.78 ^a	20.12 ^b	34.55 ^b
SAMPEA 14	11.22 ^a	20.91 ^b	28.08 ^b	12.38 ^a	20.18 ^b	30.15 ^b	11.80 ^a	20.55 ^b	29.12 ^c
SAMPEA 20-T	10.42 ^a	19.14 ^{ab}	29.17 ^b	11.39 ^a	21.91 ^b	29.20 ^b	10.90 ^a	20.53 ^b	29.18 ^c
SE(±)	0.867	1.290	3.045	0.898	1.305	3.075	0.572	0.948	1.963

Mean follows by the same letter(s) in a column are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level of probability.

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Table 3: Performance of cowpea varieties on number of branches at 3, 6 and 9 WAS and Days to 50% flowering at Unimaid, Bosu and the combined during 2024 raining season

Treatment	Number of branches per plant						Days to 50% flowering		
	Unimaid		Bosu		Combined		Unimaid	Bosu	Combined
	6	9	6	9	6	9			
FUAMPEA 1	5.75 ^b	10.59 ^a	4.61 ^b	8.33 ^{bc}	5.18 ^c	9.46 ^b	44.92 ^c	43.92 ^c	44.42 ^c
FUAMPEA 4	7.57 ^a	11.26 ^a	6.42 ^a	10.37 ^a	6.01 ^b	10.82 ^a	47.42 ^a	46.42 ^a	46.92 ^a
SAMPEA 14	5.69 ^b	7.51 ^b	4.45 ^b	7.30 ^c	5.07 ^c	7.40 ^c	46.16 ^b	45.16 ^b	45.66 ^b
SAMPEA 20-T	6.63 ^{ab}	10.33 ^a	5.41 ^{ab}	9.54 ^b	6.99 ^a	9.94 ^b	46.75 ^{ab}	45.75 ^{ab}	46.25 ^{ab}
SE(±)	0.555	0.690	0.556	0.710	0.396	0.541	0.529	0.0529	0.365

Mean follows by the same letter(s) in a column are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level of probability.

Table 4: Performance of cowpea varieties on grain yield per hectare and 100 grain weight Unimaid, Bosu and the combined during 2024 raining season.

Treatment	Grain Yield/ha			100 GrainWeight		
	Unimaid	Bosu	Combined	Unimaid	Bosu	Combined
FUAMPEA 1	1232.97 ^a	1323.88 ^a	1278.32 ^a	28.80 ^a	26.50 ^a	27.65 ^a
FUAMPEA 4	1337.43 ^a	1427.06 ^a	1382.23 ^{ab}	28.94 ^a	26.64 ^a	27.79 ^a
SAMPEA 14	892.60 ^b	982.24 ^b	937.40 ^c	18.20 ^c	15.90 ^c	17.05 ^c
SAMPEA 20-T	1283.70 ^a	1373.53 ^a	1328.69 ^b	20.85 ^b	18.55 ^b	19.70 ^b
SE(±)	51.86	52.170	35.331	0.387	0.387	0.439

Mean follows by the same letter(s) in a column are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level of probability.