

COMPARATIVE GROWTH PERFORMANCE OF THREE NIGERIAN CHICKEN GENOTYPES

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ABSTRACT

Body parameters of three Nigerian chicken genotypes were monitored weekly at different stages of their development: the chick and the grower stage. The genotypes evaluated were the Funnab Alpha, the Shika Brown and the local chicken. The body parameters monitored were the body weight, the body length, the shank length, the thigh length, the wing length, the breast length and the breast girth. The data collected were subjected to one-way analysis of variance using the General Linear Model Procedure (SAS, 2004). Mean separation for significant effects were done using New Duncan Multiple Range Test (Duncan, 1955). Regression of the body weight (dependent variable) on the linear measurements (predictors) was done using the Pearson's Moment Correlation (SAS, 2004). From the results obtained, Funnab Alpha had the best performance followed by Shika Brown, then the local chicken. Highly significant ($P < 0.01$) with high coefficient of determination were obtained for Funaab Alpha (0.918 ± 202.2248) and Shika Brown (0.880 ± 187.7151), and a lower coefficient for the local chickens (0.357 ± 637.4092).

Keywords: Regression, Body parameters, Funnab Alpha, Shika Brown, Local chicken

INTRODUCTION

One of the fastest growing segments of the animal industry is poultry production. Poultry production has its own peculiarities that make them special to national food security (Daikwo *et al.*, 2011). The Nigerian local chicken has been a major source of animal protein to the rural and peri-urban populace of the country (Omeje *et al.*, 2013). There are different ecotypes of Nigerian local chicken based on body size and ecological zones of the country (Udeh and Omeje, 2011). Chickens contribute substantially to the annual egg and meat production (up to 90%) for family consumption and for sale (Fayeye *et al.*, 2006). The dominant chicken production system is the extensive /traditional type of production using a majority of local chicken ecotypes, managed mainly on scavenging, with seasonal supplementation of home grown grains and household leftovers (Mogeset *et al.*, 2010). Consumers preference for indigenous chicken meat is attributed to the characteristics leanness, flavour and presumed organic product (King'ori *et al.*, 2010). Farmers prefer adapted productive chickens for economic empowerment of the women, for value addition, improved nutrition and health (Adebambo, 2015). Growth rate is an important tool in assessing the growth performance and potential productivity of the animal livestock. Hence the aim of this study was to determine the performance of three chicken ecotypes in Nigeria namely the Funnab Alpha chickens, the Shika Brown and the local chickens and to establish the predictability of body length, shank length, thigh length, wing length, breast length, girth and width on the body weight.

Keywords: Performance indices, Funaab Alpha, Shika Brown, local chicken, Regression

MATERIALS AND METHOD

The study was conducted at the Poultry Unit of the Teaching and Research Farms of the Federal University of Technology Owerri, Imo-State. A total of 270 birds that comprised the three genotypes namely: The Funnab Alpha, the Shika Brown and the local chicken were used for the study. Each of the genotypes consisted of 90 chicks. They birds were acquired from day old, brooded and raised to grower's stage during which data were collected. They were fed on commercial diet. Daily routine management were carried out and vaccination and medicare were given as at when due. The experimental design was completely randomized. Data were collected on the body weight, body length, thigh length, wing length, breast length, breast width and breast girth during the chick stage (0-8 weeks), and during the grower stage (9-20 weeks). Data collected were subjected to one-way analyses of variance (ANOVA) using the General Linear Model procedure (SAS, 2004). Mean separation for significant effects were done using Duncan's New Multiple Range Test (Duncan, 1955) while correlation was done using the Pearson's moment correlation (SAS, 2004).

RESULTS AND DISCUSSION

Table 1: Performance Indices of the three Chicken Genotypes in Nigeria During the Chick stage (0 - 8 weeks of age).

Performance index	Funaab Alpha	Shika Brown	Local chicken
Initial body weight (g)	33.01± 0.01 ^a	29.49 ± 0.80 ^b	25.09 ± 0.79 ^c
Final body weight (g)	864.33 ±49.75 ^a	518.17±22.50 ^b	515.60±20.91 ^c
Body length (cm)	14.15±0.26 ^a	12.90± 0.22 ^b	11.98± 0.18 ^c
Shank length (cm)	5.30± 0.12 ^a	4.69± 0.10 ^b	4.46± 0.09 ^c
Thigh length (cm)	7.90± 0.15 ^a	7.06± 0.15 ^b	6.70± 0.13 ^c
Wing length (cm)	11.22± 0.26 ^a	9.87± 0.20 ^b	9.49± 0.17 ^c
Breast length (cm)	12.38±0.25 ^a	11.10± 0.24 ^b	10.34± 0.18 ^c
Breast girth (cm)	14.28± 0.31 ^a	12.58± 0.26 ^b	11.80± 0.16 ^c
Breast width (cm)	9.70± 0.21 ^a	8.62± 0.17 ^b	7.70± 0.14 ^c

abc mean values across rows with different superscripts are significantly different (P<0.05)

Result obtained on the performance indices of the three genotypes during the chick stage were highly significant ($P<0.05$) with Funnab Alpha having the best performance in initial body weight, final body weight, body length, shank length, thigh length, wing length, breast length, girth and width. This is followed by Shika Brown which had better performance ($P<0.05$) than the local chicken with the least performance. The observed advantage of the Funaab Alpha over the local chickens was similar to the findings of Omeje and Okafor (2008). The lower mean value for all the considered traits in the local genotype was in line with several research findings of Ogbu *et al.* (2013), Malago and Baitilwake (2009) and Egahi *et al.* (2010), but was close to the values observed by N'Dri *et al.* (2006).

Table 2: Performance indices of the three Chicken Genotypes in Nigeria During the Grower stage (9 - 20 weeks of age)

Performance index	Funaab Alpha	Shika Brown	Local chicken
Initial body weight (g)	1019.57± 50.38 ^a	665.43±28.04 ^b	611.70±23.18 ^c
Final body weight (g)	1981.57±91.62 ^a	1540.97±62.89 ^b	1281.0±48.86 ^c
Mean body weight(g)	1469.68±96.67 ^a	1113.85±47.10 ^b	858.5±35.96 ^c
Body length (cm)	26.31± 0.38 ^a	23.00± 0.31 ^c	25.34± 0.35 ^b
Shank length (cm)	11.94± 0.24 ^a	10.12± 0.18 ^c	10.96± 0.22 ^b
Thigh length (cm)	14.69± 0.21 ^a	12.21± 0.20 ^c	13.90± 0.23 ^b
Wing length (cm)	22.77± 0.34 ^a	20.5± 0.35 ^c	22.00± 0.32 ^b
Breast length (cm)	22.82± 0.44 ^a	19.11± 0.26 ^c	21.11± 0.35 ^b
Breast girth (cm)	27.15± 0.54 ^a	21.46± 0.33 ^c	25.18± 0.38 ^b
Breast width (cm)	18.97± 0.35 ^a	16.22± 0.24 ^c	17.99± 0.35 ^b

abc mean values across rows with different superscripts are significantly different (P<0.05)

Performance index of the three genotypes in Nigeria during the grower stage is presented in Table 3. Funaab Alpha chicken had significantly ($P<0.05$) higher mean value for the initial body weight (1019.57±50.38)g, final body weight, mean body weight, body length, shank length, thigh length, wing length, breast length, girth and width. Shika Brown had better performance ($P<0.05$) than the local chicken. The local chicken had the least performance in all the studied parameters. Result of this study was close to the report of Msoffeet *al.* (2002) on the mean body length of the local chicken (21.6cm for hen) and (24.6cm for cock), but varied with the findings of Fayeye *et al.* (2006) (36.7 to 39.2cm) on the Nigerian local chicken. Fayeye *et al.* (2006) reported mean shank length of 9.7cm in the Nigerian local chicken which was close to what was obtained for the local chicken. Msoffe *et al.* (2002) reported the mean shank lengths of 9.7cm and 12.7cm for the local hen and cock respectively which is within the range obtained for the local chickens in this study. Daikwo *et al.* (2011) reported the mean shank length of 5.5cm in the local chicken of Dekina, which varied with those reported in the current study. Result obtained on the thigh length was close to the reports of Fayeye *et al.* (2006).

The result of this finding varied with the reports of Daikwo *et al.* (2011) on the mean breast length and girth of Dekina local chicken.

Table 3: Simple Linear Regression of the Body weight (dependent variables) on Linear morphometry (predictors) in the three chicken ecotypes (Regression coefficient $\pm$ SEM).

Predictors	Funaab Alpha	Shika Brown	Local chicken
Constant	-583.048 $\pm$ 32.658	-590.204 $\pm$ 25.059	-589.829 $\pm$ 97.298
Body length	-13.532	-11.128	46.822
Shank length	186.750	17.469	7.462
Thigh length	-21.294	27.841	43.133
Wing length	-49.259	13.756	24.658
Breast length	22.163	-1.576	-31.263
Breast girth	28.864	41.996	0.073
Breast width	17.891	5.300	1.016
R ²	0.918	0.880	0.357
R	0.958	0.938	0.597

**** Highly significant difference ($P < 0.01$)**

The multiple linear regression of body weight on linear measurements in the three chickens types was highly significant ($P < 0.01$) with high coefficient of determination for Funaab Alpha (0.918 $\pm$ 202.2248) and the Shika Brown (0.880 $\pm$ 187.7151), a lower coefficient was obtained for local chicken 0.357 $\pm$ 637.4092. The regression model accounted for 88% of the total variability in Shika Brown, 92% in Funaab Alpha and 36% in local chicken respectively. The multiple correlation indicated that they all vary together about 96% of the time in Funaab Alpha, 94% in Shika Brown and 60% in local chicken.

Shika Brown = -590.204 - 11.128BL + 17.469SL + 27.841TL + 13.756WL -1.576BRL + 41.996BRG + 5.300BRW (SEM $\pm$ 187.7151)**

Local chicken = -589.829 + 46.822BL + 7.462SL + 43.133TL + 24.658WL - 31.263BRL + 0.073BRG + 1.016BRW (SEM $\pm$ 637.4092)**

Funaab Alpha = -583.048 - 13.532BL + 186.750SL - 21.294TL - 49.259WL + 22.163BRL + 28.864BRG + 17.891 + 0.918BRW (SEM $\pm$ 202.2248)**

CONCLUSION

Results obtained in this study showed that the Funaab Alpha chicken had the best performance indices among the three genotypes, which was significantly higher than what was obtained for Shika Brown and the local chickens. However, Shika Brown had higher performance than the local genotype. Similar findings were however, obtained during the chick and grower stages respectively. Regression of the body weight on linear body measurements in the three genotypes were highly significant ($P < 0.01$) with coefficient of determination of 0.92, 0.88 and 0.36 for Funaab Alpha, Shika Brown and local chicken respectively. The result suggested that evaluation of linear morphometry in Funaab Alpha and Shika Brown would appear to be useful criteria to improve body weight.

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