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THEME  
SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

## COMPARISON OF BODY MORPHOMETRIC MEASUREMENTS AND WEIGHTS OF FOUR CHICKEN BREEDS

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### ABSTRACT

The study was carried out to compare body morphometrics and weights of commercial (Noiler and Arbor acre plus) and 2 Nigerian improved chickens. A total of 100 day-old chicks (25 per genotype) which were housed separately in a deep litter pens were used for the study. . Data were collected on growth rate (body weights (BW) and body morphometric parameters :( body length (BL), body girth (BG), wing length (WL), keel bone (KB), shank length (SL), thigh length (TL), at interval of two weeks. The result revealed a significant difference ( $p < 0.05$ ) between breeds in body linear measurements Arbor acre had the highest BW, BL, BG, KB, SL and TL of 1084g, 30.43cm, 11.93cm, 7.433cm, and 12.98cm respectively while FUNAAB alpha pullet had the lowest value of 374g, 24.79cm, 16.85cm, 0.929cm, 5.733cm and 9.63cm for BW, BL, BY, KB, SL and TL respectively . A high correlation percentage of 94%, 93%, 92% and 91% were observed between BL and SL, SL and WL, WL and BL and BW and BG respectively. It can therefore, be concluded that genotypes has effects on all the chicken studied in which the relationship between body weight and morphometric traits was found to have an important implication in the production of broilers and all other genotypes. Also there was high positive correlation between body weight and linear body measurements, as an improvement in body weight could leads to improved body morphometric.

**Keywords:** Noiler, Arbor acre plus, FIN-aB, Fin-aP, body measurements

### INTRODUCTION

Live weight and body measurements taken on live animals have been used extensively for diverse reasons both in experiments, and breeding and selection procedures (Cam *et al.*, 2010). The accuracy of functions used to predict live weight or growth characteristics from live animal measurements is of immense financial contribution to livestock production enterprise (Boggs and Merkel, 1993). Linear body measurement, also called conformation traits, is an indicator used in livestock production by commercial breeders and producers to predict body weight, growth rate, genetic improvement, body condition, conformation and carcass traits (Cam *et al.*, 2010; Ojedapo *et al.*, 2010). In this context, measurements of various body conformations are of value in judging quantitative characteristics of meat, helpful in developing suitable selection criteria (reference) as well as use as an indirect way to estimate live weight and carcass traits (Cam *et al.*, 2010). Body weight and body linear measurements can be use in developing and planning a workable breeding and improvement programme in order to increase productivity, ensure food security as well as guarantee relatively cheap animal protein source for the populace. This study was carried out to compare the body weights and selected body linear parameters in commercial (Noiler and Arbor acre) and Nigerian improved (FUNAAB Alpha pullet and broiler) chickens

### MATERIALS AND METHODS

#### *Experimental site*

The experiment was carried out at Poultry Unit of the Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora, Oyo State. Nigeria. Average ambient temperature and relative humidity were 30°C and 82% respectively while the longitude and latitude were 7°43'4"N and 5°42'32"E and on the altitude of about 130m above sea level.



#### Experimental animals and management

A total of 100 chicks (25 per genotype) comprise of Arbor acre plus, Noiler, FUNAAB Alpha broiler and FUUNAB Alpha pullet. Arbor acre and Noiler were procured from Amo Farm Sieberer Hatchery limited while FUNAAB Alpha chickens were procured at Federal university of Agriculture Abeokuta. They were housed separately in a deep litter pens at day-old. Commercial feed (Starter feed containing 20% CP and 2996Kcal/kg ME was fed from 0-4weeks, and finisher diet with 16.80% CP and 2823Kcal/kg ME fed from 5-20weeks. Clean and cool water was provided *ad libitum*. Necessary vaccinations against Newcastle and Gumboro diseases as well as prophylactic antibiotics and anti-coccidial drugs were administered at the appropriate time.

#### Data collection

Data were collected weekly on growth body weights while body linear measurements were taken every two weeks. Body weights were measured using weighing scale, and the following body linear measurements (Body length, body girth, wing length, keel length, shank length and thigh length) were taken as described by Fayeye *et al.*, (2006) using measuring tape from week one in centimeters (cm).

#### Data analysis

Data on body weight and morphometric traits were arranged in a General Linear Model (GLM) procedure and analyzed using one-way analysis of variance of SAS version 9.4 (2019). Differences among genotype means were compared by Duncan's Multiple Range test (Duncan, 1955).

### RESULTS AND DISCUSSION

The body weight and linear morphometrics evaluated are presented in Table 1. There was significant ( $p < 0.05$ ) difference between breeds in all the traits evaluated, with Arbor acre chicken having the highest BW, BL, BG, WL, KL, SL and TL value of 1084g, 30.45cm, 24.65cm, 15.55cm, 11.93cm, 7.433cm and 12.98cm respectively while FIN  $\alpha$ B had the lowest values of BW (374g), BL (24.79cm), BG (16.85cm), WL (12.67cm), KB (0.929cm), SL (5.733cm) and TL (9.63cm) respectively. This result conformed with the report of Deeb and Lamont (2002) and Carborg *et al.* (2003) observed genotypic differences in growth rate between strains.

**Table 1: Body linear measurement by genotype**

Parameter	Abor acre n=10	FIN $\alpha$ B n=10	FIN $\alpha$ P n=10	Noiler n=10
BW (g)	1084±113.20 <sup>a</sup>	374±40.04 <sup>b</sup>	439.37±63.55 <sup>b</sup>	582.80±64.48 <sup>b</sup>
BL (cm)	30.45±1.058 <sup>a</sup>	24.79±1.007 <sup>b</sup>	25.54±0.966 <sup>b</sup>	27.11±1.125 <sup>b</sup>
BG (cm)	24.63±1.254 <sup>a</sup>	16.85±0.73 <sup>b</sup>	18.00±0.909 <sup>b</sup>	18.99±0.815 <sup>b</sup>
WL (cm)	15.55±0.589 <sup>a</sup>	12.67±0.502 <sup>c</sup>	13.53±0.604 <sup>bc</sup>	15.15±0.692 <sup>ab</sup>
KB (cm)	11.93±0.515 <sup>a</sup>	0.929±0.425 <sup>c</sup>	10.12±0.466 <sup>c</sup>	10.89±0.520 <sup>b</sup>
SL (cm)	7.433±0.249 <sup>a</sup>	5.733±0.236 <sup>c</sup>	5.817±0.259 <sup>c</sup>	6,717±0.2730 <sup>b</sup>
TL (cm)	12.98±0.561 <sup>a</sup>	9.63±0.417 <sup>c</sup>	10.28±0.491 <sup>bc</sup>	11.85±0.795 <sup>ab</sup>

<sup>a,b,c</sup> means in the same row within variable group with different superscripts are significantly different ( $p < 0.05$ ).

FIN  $\alpha$ B = FUNAAB Alpha Broiler; FIN  $\alpha$ P = FUNAAB Alpha Pullet (Dual pullet); BW = Body Weight; BL = Body Length; KB = Keel Bone; SL = Shank Length; BG = Breast Girth; WL = Wing Length; TL = Thigh Length.

The correlations between body weight and other selected body morphometric are presented in Table 2. The highest positive correlation coefficient of 0.946 was observed between body length and shank length while lowest correlation coefficient (0.706) was observed between body weight and keel length. This result conforms with the report of Ojo *et al.* (2010) who observed a high and positive genetic correlation coefficient at 2 weeks of age between body weight, back length, shank length, and chicken height and Okpeku *et al.*, (2003) who reported a positive correlation between body weight, body length, chest circumference, femur and crust, but however they reported a negative low correlation between body weight and tarso-metatarsus (shank length) among local chicken. Similarly, Okon and Ogundu (2006) observed high and positive phenotypic correlations between body weight, thigh length, chest circumference, breast width, keel length and shank length, and



concluded that these morphometric parameters are good indicators of body weight. The present finding differed slightly from that of Udeh and Ogbu (2011) who observed a positive and non-significant ( $p>0.05$ ) relationships between body weight and other body measurements across three broiler strains.

**Table 2: Pearson correlation between body weight and linear body measurement at week 6**

Parameters	BW	BL	BG	WL	KB	SL	TL	GENOTYPE
<b>BW</b>	1							
<b>BL</b>	0.868**	1						
<b>BG</b>	0.912**	0.905**	1					
<b>WL</b>	0.816**	0.927**	0.846**	1				
<b>KB</b>	0.706**	0.799**	0.766**	0.816**	1			
<b>SL</b>	0.870**	0.946**	0.896**	0.931**	0.831**	1		
<b>TL</b>	0.800**	0.845**	0.773**	0.816**	0.548**	0.815**	1	
<b>GENOTYPE</b>	-0.333**	-0.173 <sup>NS</sup>	-0.298**	-0.011 <sup>NS</sup>	-0.093 <sup>NS</sup>	-0.150 <sup>NS</sup>	-0.089 <sup>NS</sup>	1

\*\*Correlation is significant at the 0.01 level (1-tailed)

BW = Body Weight; BL = Body Length; KB = Keel Bone; SL = Shank Length; BG = Breast Girth; WL = Wing Length; TL = Thigh Length.

**CONCLUSION**

From the result of this study, it could be concluded that genotypes has effects on all the chicken studied in which the relationship between body weight and morphometric traits was found to have an important implication in the production of broilers and all other genotypes. Also there was a high positive correlation between body weight and linear body measurements, suggesting that an improvement in body weight could lead to an improvement in other body morphometric which could be exploited in selection program for genetic improvement.

**RECOMMENDATION**

Based on the results of this study, I hereby recommend that;

- The Arbor acre birds have the best body weight and other morphometric traits. Therefore, should be explored for conservation and breeding program so as to improve the performance of the indigenous chicken.

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