BREED EFFECT ON MORPHOMETRIC TRAITS IN PULLETS

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Abstract
The study aimed to characterize three breeds of pullets based on their morphometric differentiation and effects of age on their body linear measurement. The three breeds of pullets under consideration were Noiler, FUNAAB alpha and Isa brown. One hundred and thirty-nine pullets raised comprising 48- FUNNAB alpha, 45- Isa brown and 46- Noiler. The pullets were weighed individually and linear body measurements taken. The weights of the birds were obtained using a 20 kg weighing scale, while a measuring tape was used for body measurements in centimeter. There was no significant difference between FUNAAB alpha and Noiler breeds in the following morphometric traits: Body weight (BW); Wing length (WL); Breast girth (BG); Shank length (SL) for all ages under consideration. Isa brown had significantly lowest values for all the traits measured at all ages. It can be concluded that breed had effect on the morphometric traits.
Keywords: Breed, Morphometrics traits, Noiler, FUNAAB alpha, Isa brown

Introduction

Morphometric traits are the quantitative measurements of the structure, shape, and size of an organism (Fayeye *et al.,* 2006). The body weight can be derived from the measurement of different parts of the body of the animals. This is an easy way to measure the differences in different types of breeds available in a particular location especially among rural poultry breeders (Semacula *et al.,* 2011). Morphometric traits such as shank length and diameter were indicators of leg development while body girth was an indicator of breast development (Maciejowski and Zeiba 1982). Morphometric traits can be used to predict the weight gain and as well to plan breeding strategies to use to improve on the production and performance of the poultry birds. Genetic diversity is also evaluated using morphological, biochemical and molecular characterisation methods (Costal *et al.,* 2006).

Morphological characterisation is influenced by environmental factors, hereditary factors and evolutionary origin of the breeds. Morphometric traits are correlated with body weight. Thus, such morphometric traits could be used as markers in body weight improvement programmes and as body weight predictors especially in pullets (Chineke, 2005). A breed is a specific group of farm animals having homogeneous appearance, and/or other characteristics that distinguish it from other organisms of the same species. Breed specific characteristics, also known as breed traits, are inherited, and purebred animals pass such traits from generation to generation (Costal *et al.,* 2006).

Pullets are between 16 to 52 weeks of age. They have been brooded, now have adult feathers and are in their first year of lay. Pullets have unique characteristics because of their main purpose of egg laying. One other characteristic of a pullet chicken is its pelvic bones. They are closer together than those of the hens. And in weight, pullets are noticeably lighter than the hens. This study considers the differences and similarities in the morphometric traits of pullets raised in the battery cage system. The three breeds under investigation are Noiler, Isa brown and FUNAAB alpha. Noiler is a new type of dual-purpose chicken breed that has been created through selective breeding. Noiler is believed to be a product of genetic selection between the broiler and the native chicken. This unique fowl is bred to serve the dual purpose of producing both meat and eggs. FUNAAB alpha is a black harco. It is an ideal bird for changing climatic conditions, both in the cage and non-cage systems. The Black Harco has a heavier body weight, comparable to backyard birds, but is able to perform well in large operations. The ISA Brown pullet has proven more than 40 years of excellent performance as the best brown laying hen in the world. Extensive field testing with the ISA Brown shows that the ISA Brown has exceptional feed conversion and is capable of laying up to 500 first-quality eggs (Oluyemi, 1980). This study compares the morphometric traits of these three breeds of laying chickens in order to predict their performance for both meat and egg production.

Materials and methods

Site of the experiment: The study was carried out at the Teaching and Research Farm and Agriculture Laboratory of Olusegun Agagu University of Science and Technology, Okitipupa, Ondo State, Nigeria. Okitipupa lies between the coordinates $6^0$25 and $6^0$46 N and $4^0$35 and $4^0$50 E within the tropical rainforest zone of Nigeria. Okitipupa covers a total landmass of 636 square km and has an estimated population of 233.565 people.

Experimental design: One hundred and thirty-nine pullets were raised from day old to 4th week of age. The pullets comprise of 48 FUNNAB alpha, 45 Isa brown and 46 Noiler. The pullets were raised in a deep litter system and fed with commercial feed and water supplied ad libitum throughout the period of the study.

Data collection and analysis: Bodyweights of the birds were obtained using a sensitive scale, while a measuring tape was used for body measurements in millimeter on weekly basis. Wing Length (WL) was taken from the shoulder joint to the extremity of terminal phalanx while Shank Length (SL) was measured from the knee joint to the spur. Breast girth (BG) was taken under the wing at the edge of the sternum. The data collected were subjected to analysis of variance (ANOVA) using SAS (2007).

Results

Table 1 shows the summary of the statistics of the body biometrics on the basis of three breeds of pullets under consideration. The mean values of body weight for FUNAAB, ISA and Noiler were 127.60g, 88.11g and 105.61g respectively. Table 2 shows the breed effects on morphometric traits on the age basis. There was no significant difference between FUNAAB alpha and Noiler breeds in the following morphometric traits: Body weight (BW); Wing length (WL); Breast girth (BG); Shank length (SL) for all ages under consideration. Isa brown had significantly lowest values for all the traits measured at all ages. At weeks 1 and 3, there was no significant difference between FUNAAB and Noiler in Shank length (SL) while Isa brown differed significant. At week 4, no significant difference was recorded in all the breeds for SL. For Wing length, Noiler had the longest Wing length which was very significant at 4th week ($p<0.05$). For breast girth, Isa brown had lowest breast girth (BG) which was highly significant from the other two breeds.

Table 1: Summary statistics

Breed	No. Obser.	Variables	Mean	SD	Min	max	CV
FUN	48	BW	127.60	90.13	29.00	372	70.63
		SL	2.73	0.81	1.20	4.20	29.80
		WL	7.68	2.53	4.00	12.00	32.97
		BG	10.36	2.97	6.50	18.00	28.68
ISA	45	BW	88.11	51.80	29.00	250.00	58.79
		SL	2.16	0.59	1.10	3.00	27.51
		WL	7.70	2.22	4.50	12.00	28.87
		BG	9.15	1.85	6.50	3.00	20.24
N	46	BW	105.61	66.80	30.00	26.5	63.26
		SL	2.29	0.71	1.00	4.00	31.16
		WL	7.67	2.82	3.00	14.00	36.8
		BG	9.84	2.34	5.50	4.00	23.75

FUN = Funaab Alpha, ISA = Isa brown, N = Noiler, BW = Bodyweight, SL = shank length, WL = Wing length, BG = breast girth, SD = Standard deviation, CV = coefficient of variation

Table 2: Breed effect on morphometric traits in pullets

WEEK	BREED	BW (g)	SL (cm)	WL (cm)	BG (cm)
0	FUN	33.90	1.17	4.37^b	6.60
	N	33.80	1.21	4.35^b	6.55
	ISA	33.10	1.36	5.05^a	6.75

	SEM	0.43	0.21	0.11	0.08
1	FUN	61.40[a]	2.30[a]	5.97	8.76[a]
	N	59.00[a]	2.35[a]	5.50	8.93[a]
	ISA	50.20[b]	2.0[b]	6.02	8.24[b]
	SEM	1.43	0.05	0.13	0.09
2	FUN	108.20[a]	2.33	8.17	10.39[a]
	N	99.40[b]	2.38	8.43	10.00[a]
	ISA	80.38[b]	2.23	8.10	8.87[b]
	SEM	4.16	0.05	0.10	0.17
3	FUN	199.20[a]	2.70[a]	9.29	12.45[a]
	N	166.10[ab]	2.60[a]	9.45	11.80[ab]
	ISA	133.50[b]	2.33[b]	8.97	10.60[b]
	SEM	8.49	0.05	1.16	0.28
4	FUN	262.25[a]	3.38	11.31[b]	14.44[a]
	N	212.50[a]	3.33	12.58[a]	13.33[a]
	ISA	165.25[b]	3.06	11.13[b]	11.75[b]
	SEM	13.56	0.09	0.21	0.35

FUN = Funaab Alpha, ISA = Isa brown, N = Noiler, BW = Bodyweight, SL = shank length, WL = Wing length, BG = breast girth, Means on the same row with the different superscripts are significantly different ($p<0.05$)

Discussion

The increase in all the traits as the age increases across the genotypes is in conformity with the report of Ojedapo *et al*. (2008). The non-significant effect of breed observed at zero week in body weight is contrary to the report of Ojedapo *et al*. (2008)0, who reported strain effect among Nera black, Brown shaver and Black shaver. The breed effect observed in other ages considered are in line with observations Crawford (1990), and Ebangi and Ibe (1994). They all reported differences in growth traits of chicken as a result of genotype and age. The non-significant different observed between Noiler and Funaab Alpha in virtually all the traits considered may be due to the fact that they are both heavy breeds, for egg and meat production. Low values were reported for ISA brown compare to Noiler and Funaab Alpha in the traits considered.

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